REPORT OF THE

ICAR REVIEW COMMITTEE

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भाकृअनुप
ICAR

INDIAN COUNCIL OF AGRICULTURAL RESEARCH

1988

PRINTED MARCH 1988

Phototypeset at Scanset, C-36 Connaught Place, New Delhi - 110 001, printed at M/s Rekha Printers Pvt. Ltd. A-102/1 Okhla Industrial Estate, Phase II, New Delhi - 110 020 and published by Shri Thakur Das, Under Secretary (P&E), Indian Council of Agricultural Research, Krishi Anusandhan Bhavan, Pusa, New Delhi - 110 012

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ICAR REVIEW COMMITTEE

ROOM NO. 5, KRISHI BHAVAN, NEW DELHI-110001

DR. G.V.K. RAO,
CHAIRMAN

D.O.No.RC/8-15/87-ICAR

March 25, 1988

My dear Shri Bhajan Lal,

May I invite reference to Office Order No. 30-30/85-Estt. dated the 6th April 1987 in which the Union Minister of Agriculture, in his capacity as the President of the ICAR Society, set up a Committee under my chairmanship to review the existing organisational infrastructure, personnel policies and functional role of the ICAR.

2. The Committee had wide terms of reference. It held nine meetings. The members of the Committee visited different ICAR Institutes and State Agricultural Universities, to discuss problems pertaining to Agricultural Research, Education, and Extension. They met the Directors of the ICAR Institutes, Project Coordinators of All-India Coordinated Projects and Vice-Chancellors of the State Agricultural Universities. They also met senior officers dealing with Agriculture in the States visited.

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3. The Committee had circulated a detailed questionnaire to nearly 1500 persons connected with the subject. More than 500 responded to the questionnaire. The Committee had the benefit of sectoral reviews made by some eminent agricultural scientists.

4. A National Workshop was held in Hyderabad from 9th to 11th October 1987, when eminent men associated with agricultural research, development, and education participated. Dr. G.S. Dhillon, the then Minister for Agriculture, inaugurated the workshop. Senior people like Prof. N.G. Ranga, Shri C. Subramaniam and Shri Annasaheb P. Shinde participated, and gave valuable advice.

5. I am now happy to forward the report of the Committee for your consideration.

6. The ICAR has been in existence for some time, and the work has been periodically reviewed. A detailed review was undertaken last time by a Committee headed by Shri Gajendragadkar, retired Chief Justice, Supreme Court of India, in 1972.

7. A number of far-reaching and important changes have taken place during the last two decades in the field of Indian agriculture.

8. Thanks to the work done by agricultural research scientists, administrators, farmers and policy makers, and due to a proper balance of well-orchestrated decisions, Indian agriculture made rapid strides. From a production level of about 50 million tonnes of cereals at the time of Independence, an impressive figure of 150 million tonnes has now been reached. The country was importing large quantities of foodgrains in the past. That has been considerably reduced during the last decade, and practically eliminated in some years. A large buffer stock - more than 23 million tonnes - was built up. This helped the country to effectively tackle the problems of the very serious drought the country faced during the last two years.

9. The requirements of the country by the turn of the century have been assessed by various authorities, particularly the National Commission on Agriculture and the Planning Commission, at about 240 million tonnes of foodgrains. Recent demographic calculations, and the pressures caused by change in income levels, would indicate that our requirements may be even higher.

10. Unfortunately, due to a variety of complex causes, agricultural production has been on a plateau during the last 3-4 years, and foodgrains are at the level of about 150 million tonnes. We have to increase our production of cereals by nearly 100 million tonnes in the next 12 years. In addition, the production of oilseeds and pulses has to be stepped up. Water management is poor. The problems of dryland farming call for vigorous action. Marketing and processing of agricultural produce to ensure a proper return to the farmer are areas calling for attention. Considerable research work has been done by the ICAR system. But there have been serious problems in the transfer of technology, in full measure, to the farmers' fields.

11. These are difficult tasks, and to face them would require strong political will, a high level of research capabilities, and coordinated administrative action.

12. Agriculture will remain the occupation of a large number of people in this country for the next two to three decades. The creation of employment opportunities in rural areas would need high priority. Rural poverty and unemployment is the worst pollution that is also damaging the environment.

13. The base for agricultural production, viz. land, water and air, are being irretrievably damaged - and it is essential to reverse the trend.

14. The country has rightly decided that agriculture should receive very high priority during the next few years.

15. Agricultural research will have to play an extremely important role in trying to ensure that these tasks of the future are properly faced.

16. The ICAR and the band of its scientists have done good work and competent institutions have been built up. Our review has indicated that the system is capable of meeting the challenges if some remedial steps are immediately taken.

17. The ICAR has to become an intellectual power-house, providing direction and orientation for agricultural research and education. It should consider the needs for research in agriculture for tomorrow. It should avail of new scientific opportunities, and be in the forefront of research. There will have to be modern approaches, rather than multiplying the existing programmes and infrastructure.

18. Political leaders and administrators can set goals, but it would be the responsibility of the scientists and technicians to fulfil them.

19. The ICAR Headquarters has grown considerably during the last few years. Now that a number of Institutes and Agricultural Universities have come into being, the time has come for a lot of routine work that is now being done to be eliminated. The ICAR Headquarters can now confidently shed many of its routine responsibilities to the Institutes and Agricultural Universities. The ICAR should unshackle itself from trivia, and provide sophisticated and competent leadership. It should continuously study the problems of Indian agriculture in the widest sense of the term, identify the problems for research, education and extension, and guide, stimulate, and monitor the work of Institutes and Agricultural Universities towards coordinated and purposive action.

20. The ICAR must be given full autonomy in its day-to-day working, which it now lacks. There is no reason why it should not function like the Atomic Energy Commission, the Space Commission, the CSIR and other bodies.

21. The ICAR Institutions should also similarly be vested with all powers and authority for managing their own affairs, subject to a clear mandate being drawn for each Institution, and enforcing accountability.

22. Decentralisation is essential to make the system work efficiently.

23. It is also necessary to build up a scientific culture, where there is mutual respect and regard, for discussion, a quest for excellence, and a conscious attempt to locate talent in young people, and to stimulate them to do work of a consistently high order.

24. The Committee has considered issues regarding the organisational structure of the ICAR, the role of the ICAR Institutes, the linkages with State Agricultural Universities, the manner in which research should be planned and implemented, monitored and evaluated, and also personnel policies.

25. The thrust of our recommendations is to make the ICAR tall, slim and healthy. It should become a body with vision and vigour — vision to analyse the problems of Indian agriculture, particularly issues like the ecological sustainability of Indian agriculture, the economic viability of agricultural production, the problems of equity in agricultural growth, and in particular developing a system of education and training which would handle the problems of the future.

26. The ICAR should handle the frontier areas of agricultural research and development in areas like bio-technology, tissue-culture, genetic engineering, computer application, environment education, energy management, etc.

27. The achievements of Indian agriculture during the next two to three decades will to a large extent determine the pace of economic development, and the management of socio-economic tensions in rural India. The finest intellectuals in the country will have to be attracted into the ICAR system, so that these activities can be coordinated.

28. The ICAR system during the last five years has become somewhat inward-looking. This trend has to be reversed. It should attract talent from outside the system, and build up links with organisations like the ICSSR, CSIR, traditional Universities, and other Government and voluntary non-Government organisations as well.

29. Our recommendations are based on a thorough review of the existing system, and after discussion with a wide spectrum of people concerned with the system. They are capable of quick implementation.

30. I do hope that the Committee's report will assist you in building up a strong research and education system which can serve the needs of Indian agriculture which should no longer be treated as an occupation of drudgery, providing a low quality of life. It should become intellectually satisfying, and economically profitable.

31. I would like to place on record our sincere thanks and appreciation of the assistance given to the Committee by a number of people. In particular, I would like to mention the very generous and timely assistance given by Dr. N.S. Randhawa, Director-General, Indian Council of Agricultural Research (ICAR), who has given us outstanding support but for which the work of the Committee would not have been completed in time.

32. I would like to express the deep appreciation of the Committee for the hard and painstaking work put in by Dr. R.M. Acharya, Member-Secretary of the Committee. He worked with great care and devotion. The demands of the Committee to collect considerable information on a wide variety of subjects were met by him with great efficiency. He contributed to the drafting of the chapters, and gave the best of his considerable knowledge of the ICAR system.

33. The Committee would also like to place on record the very competent assistance given by Dr. K.V. Raman, Director of NAARM. He functioned as Joint Secretary of the Committee. He was responsible for the very competent manner in which the National Workshop was organised at Hyderabad. He and his colleagues prepared the agenda papers, after the scrutiny of all the replies to the questionnaire, and was mainly responsible for preparing the first draft of the report. He was closely associated with the work of the Committee, and his wide knowledge was of considerable help to the Committee.

34. Both Drs. R.M. Acharya and K.V. Raman assisted the Committee in addition to their normal duties. But for their unstinted cooperation, it would not have been possible for us to complete the work.

35. Drs. Raman and Acharya and his colleagues at the ICAR Headquarters, made detailed arrangements for our tours and visits and fixed up meetings with a number of people. They bore cheerfully all the demands of the members of the Committee and we are grateful to all of them.

36. The Committee has completed the task in a constructive way, with an eye to the future.

37. It was a privilege for me to have been associated with this Committee. All the members were extremely distinguished persons in their areas of specialisation, and gifted with extraordinary abilities and deep insights. They visited many institutions and made valuable notes of their visits which enabled us to share their wise experience. The discussions were intensive, and we were able to arrive at collective decisions. The main purpose of all of us was to make the ICAR system an efficient tool to handle the problems of Indian agriculture of tomorrow. Our intention is not to blame anybody or to find fault. On the other hand, the members of the Committee were motivated by a genuine desire to see that the ICAR is enabled to play a vigorous and positive role in meeting the challenges of Indian agriculture in the years to come. I am personally most grateful to all the members of the Committee for their unstinted cooperation.

With warm personal regards,

Yours sincerely,

(G.V.K. RAO)

Shri Bhajan Lal
Hon'ble Union Minister of Agriculture
Government of India
Krishi Bhavan
New Delhi

REPORT OF THE ICAR REVIEW COMMITTEE, 1988

New Delhi.
March 25, 1988

Shri Bhajan Lal,
Minister for Agriculture, and
President, ICAR Society,
New Delhi-110 001

Sir,

The President, ICAR Society, had constituted a Committee to review the organisational structure, personnel policies, and functional role of the Council vide letter of April 6, 1987.

The Committee has completed its deliberations and has great pleasure in submitting its Report.

Yours faithfully,

G.V.K. Rao

G.V.K. RAO
Chairman

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Y.K. Alagh
Y.K. ALAGH

V.A. PAI PANANDIKAR

J.S. KANWAR

R.C. PAUL

V. KURIEN

G. RANGASWAMI

B Misra
B. MISRA

G. S. Sidhu
G.S. SIDHU

Karam S. Nandpuri
K.S. NANDPURI

(X) C.M. Singh
C.M. SINGH

R.M. ACHARYA
Member-Secretary

(X) Note of dissent of Dr C.M. Singh
submitted.
C.M. Singh

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SUMMARY OF MAJOR RECOMMENDATIONS

GENERAL

1. Considering the importance of agriculture in providing food, fibre and fuel, generating rural employment, and the need for increased S&T input to maximize output from scarce land, water and other agricultural inputs, there is a strong need for increasing investment on agricultural research. (4.16)

2. The existing mandate of the ICAR may be modified to cover broader areas of rural development and post-harvest technology in order to meet the needs of the changing agricultural scenario. by developing co-operative programmes with other organizations. (5.4)

ORGANIZATIONAL STRUCTURE OF THE ICAR TO FULFIL ITS MANDATE

3. The ICAR should concentrate on basic and strategic research or research on other problems of national importance. The regional problems may be tackled by the ICAR only where these cannot be handled by the SAUs/State agencies. The ICAR Institutes should become Centres of Excellence and develop their national character in real spirit. (5.6)

4. The ICAR Institutes should concentrate only on post-graduate teaching programmes leaving under-graduate teaching to the SAUs, at the same time maintaining complementarity with the educational programmes of the SAUs (5.9 and 8.10)

5. Direct field-level extension should be the responsibility of the developmental departments of the Central and State Governments, and the ICAR and the SAUs should be involved only in the first-line extension activities and in educating and training the extension workers of the State agencies and farmers. There should also be an integrated system of delivering extension material to the farmers, for which the SAUs, ICAR Institutes and State Development Departments should have a co-ordination

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mechanism so that only a single set of recommendations related to crop and livestock production reaches the farmer.
(5.10 and 9.25)

6. The ICAR should develop its own computerizd satellite-based information network which should be available to scientists at the ICAR Institutes and the SAUs on on-line terminals. The existing Publications and Information Division and the Agricultural Research Information Centre in the ICAR should be merged and converted into a separate Directorate of Publications and Information, and this activity should be suitably strengthened.
(5.11)

7. The ICAR should pay more attention to the economic analysis of its programmes and projects; for this purpose it should create and strengthen the required infrastructure, including manpower.
(5.15)

8. For ensuring a greater degree of effectiveness, the ICAR as a whole, including the 3 National Institutes, should continue to be a Society. The National Institutes may be conferred maximum autonomy and flexibility in their operational sphere.
(5.19 and 5.20)

9. For providing greater operational autonomy, the ICAR should be empowered to amend its rules and bylaws, without reference to the Government. Immediate steps may be taken by the ICAR to develop its own rules, regulations and working procedures in a manner that would ensure its complete financial and administrative autonomy. (5.19 and 5.28)

10. The membership of the ICAR society is at present large and unwieldy. It should comprise policy planners, administrators and representatives of scientific organizations. Accordingly the composition of the General Body should be modified. (5.23)

11. The Governing Body of the Council should act as a "Think Tank" providing leadership and guidance in all matters relating to agricultural research and eduction. The Governing Body should be truly professional in nature and should primarily have a membership of the scientists related to agriculture and allied

areas/eminent persons and it should act as an independent decision-making and policy-implementing Body. (5.25 and 5.31)

12. The Finance Wing of the ICAR should be reorganized separating the Audit from Accounts, and greater emphasis be laid on internal audit and inspection of accounting procedures of the ICAR Institutes to ensure uniformity in financial procedures and proper accountability at all levels. (5.29)

13. The PIC/EFC procedures should not apply to the ICAR for sanctioning the Plan schemes. Similarly, sanction of additional posts, purchase of vehicles and works programmes, wherever these are part of the Plan schemes, should be looked into by the ICAR itself and finalized by the Governing Body without reference to Finance. (5.30)

14. The UGC and the ICAR should develop a Memorandum of Understanding to enable the ICAR to discharge its role in determining and maintaining the standards of agricultural education. Further, the Norms and Accreditation Committee should be reconstituted and provided suitable authority. (5.33 and 8.14)

15. The composition of the Regional Committees of the Council constituted on the basis of agroclimatic zones should be revised. The Director of one of the Institutes in the region acting as Member-Secretary may be assisted by a Joint Director who will act as a liaison Officer and follow up the action taken by different agencies. (5.34)

16. The Scientific Panels should play a greater role in research planning in their specialized areas and thus assist the Research Committees at the Institutes and the Standing Policy Planning Committee at the Headquarters in research planning. (5.36)

17. The existing dichotomous structure at the Headquarters dealing with technical and administrative matters separately should be dispensed with. (5.37)

18. At the Headquarters of the ICAR, an Officer-oriented system of working at all levels, with adequate provision for level-jumping, as also Desk Officer system should be introduced. The ICAR

should also introduce modern office equipment and procedures so as to cut down delays and improve efficiency. (5.39)

19. The Secretary, ICAR, should be a whole-time employee to be borne on the strength of the ICAR and be appointed on a tenurial basis. His functions should also be revised. (5.43 and 5.44)

20. The strength of the personnel at the Headquarters, both of technical and administrative categories, should be critically reviewed by a professional management institute like the IIM, Ahmedabad. Meanwhile, the strength of the DDGs and ADGs may be frozen at the present level and, if possible, the ICAR should try to reduce the number of posts at these levels through deployment elsewere. There should be no post of scientists below the level of ADG at the Headquarters. (5.45)

21. To bring greater inter-divisional co-ordination, the ICAR Headquarters may be organized into three groups dealing with (a) Crop Sciences (including Crops, Soils, Agronomy, Engineering, and Horticulture), (b) Animal Sciences (including Fisheries) and (c) Human Resources Development (including Basic and Social Sciences, Education and Training). (5.46)

22. The ICAR should be authorized by the DARE to directly deal with the Departments and Ministries of the Government of India, as also foreign Governments, and to enter into international and bilateral agreements, wherever necessary. (5.54)

23. The ICAR should develop a dynamic programme for Human Resources Development, particularly by encouraging the newly recruited young scientists of the ARS to benefit from the training at CG Centres as post-doctoral candidates, research fellows or in-service trainees. (5.60)

24. The ICAR should develop consultancy services and provide foreign technical assistance in Agricultural Research and Education to developing countries. (5.63)

ICAR INSTITUTES - THEIR ROLE AND RELATIONSHIP WITH THE HEADQUARTERS

25. The ICAR should decentralize administration by giving greater

autonomy to the Institutes, especially in the technical, financial and operational matters, and the Institutes should be endowed with adequate technical autonomy by way of freedom for planning, implementation and monitoring of programmes assigned to them. (5.53 and 6.8)

26. To further assure autonomous functioning of the Institutes, necessary technical-cum-financial and executive powers, beyond the powers of the Director, should be vested with the Institutes' Management Committees. These Committees should, in fact, perform functions for the Institutes the way the Governing Body does for the ICAR or the Board of Management for the Agricultural Universities. Most of the decision-making process in the Institutes should end at the level of the Management Committee. In order to make the Management Committees more effective bodies, their composition should also be revised. (6.12 and 6.13)

27. In order to improve upon the existing system of procurement, custody and accounting of stores equipment, the ICAR should immediately withdraw itself from the purview of the DGS&D and introduce appropriate purchase procedures. (6.18)

28. The Commodity Institutes and the related AICRPs should be located together wherever possible. Their research efforts should be fully co-ordinated and periodically evaluated by a single QRT. Sectoral review may also be done once in five years. (6.22)

29. Prima facie there is considerable duplication in the research work being carried out by the former and new Institutions. There is, therefore, an urgent need for the ICAR to take a fresh look at the mandate of each of its Institutes and take measures to suitably modify the mandate of the Institutes in the light of the establishment of new Institutes. The ICAR may not start any new Institute during the next five years except through regrouping of the existing activities and redeploying the existing resources. It should rather consolidate the present set-up and provide it a greater financial support. (6.23)

30. The ICAR may be given an additional one-time grant to modern-

ize laboratory and farm facilities in its Institutes and State Agricultural Universities. (6.29)

31. The income generated by the Institutes through the sale proceeds of products/services should be allowed to be ploughed back to the Institute funds for bridging unforeseen requirements and for upgrading their laboratories and farm facilities. The ICAR Institutes should be allowed to accept sponsored research programmes to generate additional resources. (6.32)

32. A Research Committee comprising policy makers, planners, scientists, user departments and farmers should be set up at each Institute to identify priority problem areas and formulate research programme of the Institute concerned. (6.35 and 10.61)

33. The ICAR should ensure that review and evaluation by the QRTs is carried out at regular intervals and their recommendations implemented. (6.37)

PERSONNEL POLICIES

34. The planning for manpower requirements of each Institute and Research Unit of the ICAR should start at least two years prior to the commencement of the next five-year plan, which should be primarily based on the work-load of the on-going and the new projects. The requirements for the new projects should essentially be met by redeployment. (7.7)

35. The scope of the Agricultural Research Service should be enlarged to include grades from S-1 to S-6 and the five-yearly assessment system should be applicable for all the grades of the Service. (7.12)

36. There should be no relaxation in the prescribed minimum qualification of Master's degree in any of the disciplines for entry into the ARS. For disciplines of Engineering and Technology as also for Veterinary and Animal Sciences, for which there is serious dearth of suitably qualified candidates, the ICAR should provide adequate number of fellowships to graduate-level candidates in order to encourage them to undertake higher studies in specified

fields as required by the ICAR. Besides this, in order to attract candidates of these disciplines to the ARS, the ICAR should grant five advance increments to ARS selectees on their appointment in the ARS. (7.14)

37. In order to ensure the availability of outside talent in the ARS, at least 25% vacancies in grades S-4 to S-6 for direct recruitment through lateral entry be reserved for candidates from outside the ARS. (7.18)

38. There should be no separate research-management cadre as such. The posts of DDGs, ADGs, Directors, etc., involving research-managerial functions should be filled by direct recruitment on a tenurial basis. However, for tenurial appointees adjudged suitable for continued employment in the ICAR, there should be a provision for their absorption in the ARS in equivalent grades. For recruitment to these positions, it is not necessary to prescribe the requirement of research-management experience as an essential qualification. (7.19 and 7.20)

39. The present system of appointment of scientists as Heads of Divisions by rotation should be dispensed with and the posts be filled by direct recruitment on a tenurial basis at grade S-4 level. (7.22)

40. The present system of the ASRB involving the ICAR in screening the applications received in response to advertisments for identifying candidates to be called for interview, should be discontinued. The ASRB itself should assume this responsibility. (7.29)

41. The ASRB should be an independent and fully autonomous body with a separate budget, staff and operational procedures, and should function on the lines similar to the UPSC. (7.30)

42. The pay scales of Scientists S-1 to S-3 should be on a par with those recommended by the UGC for the Universities from the level of Assistant Professors through Readers to Professors. (7.33)

43. Participation of scientists in National and International Confer-

ences and Seminars should be encouraged, particularly when they are invited to present papers or for delivering lectures in view of their expertise and standing in the field. (7.40)

44. In order to encourage scientists to acquire higher academic qualifications and research expertise, they should be liberally granted sabbatical leave, in addition to study leave or other kind of leave, of nine to twelve months in one or two spells throughout their service. (7.41)

45. The duration of 'study leave' granted to scientists who have to go outside the Institute for acquiring Ph.D. degree should be increased from the present limit of 24 months to 36 months, depending upon the actual requirements. This period of study leave should count towards service. (7.42)

46. A combined cadre for technical posts in the ICAR should be created covering grades from Rs 700-1300 (pre-revised) and above in order to encourage inter-institutional mobility of the incumbents. Further, provision for selection grade posts beyond the existing scale of Rs 1500-2000 should also be made. (7.45)

47. Administrative personnel may be given adequate avenues for promotion to higher grades. To begin with a few selection grade posts may be provided at different levels to facilitate advancement of those personnel who might be stagnating in their existing grades for long. (7.47)

48. The ICAR may evolve a Scheme whereby the administrative staff of the level of Section Officer and above at the ICAR Headquarters, and Assistant Administrative Officer and above at the Institutes, should be exchanged on a systematic and regular basis. (7.49)

49. For administrative staff, the age of retirement may be raised from 58 years to 60 years. (7.50)

50. The existing category of auxiliary staff may be abolished and merged with technical/administrative/supporting categories, depending upon the functions/scales of pay/qualifications prescribed for each of them. (7.53)

51. In order to enable scientists to seek redressal of their grievances of general nature, the ICAR should create a body similar to the Joint Consultative Machinery (JCM) working for other employees in the ICAR. (7.55)

LINKAGE OF ICAR WITH STATE AGRICULTURAL UNIVERSITIES

52. To avoid intellectual inbreeding among scientists, both the ICAR and the SAUs should encourage students and teachers to obtain at least one of the degrees from SAUs other than those from which the candidates had obtained under-graduate or post-graduate degrees, and these Universities should reserve 25% of seats in post-graduate degree programmes for candidates from outside the State. (8.13)

53. For the purpose of determining the quantum of assistance given by the ICAR to the SAUs, the criteria should be the level of development of the University and professional potential, cultivated land area, population and number of farm families in the area of responsibility of the University, and the number of campuses as well as the number of students. (8.21)

54. There is a need for co-ordination amongst the SAUs located in the same State, and the States should appoint suitable Co-ordinating Committees of Vice-Chancellors under the Chairmanship of an eminent agricultural scientist so as to ensure delineation of education and research responsibility of the SAUs within a State. (8.23)

TRANSFER-OF-TECHNOLOGY PROGRAMMES

55. Considering their importance, transfer-of-technology programmes should be adequately strengthened. (9.1)

56. The National Demonstrations Project may be extended to other fields like horticulture, livestock production, etc., and financial support should be enhanced for the provision of inputs. (9.10)

57. Considering the usefulness of KVKs in the transfer of technology

to farmers in an integrated manner, further support be given to provide at least one KVK in each district. Leadership, guidance and monitoring of the KVK project by the Council in collaboration with the State Government should continue. The pattern of funding of the project may, however, be revised. The ICAR may provide 100% of the funds during the first five years, 50% during the next five years and 25% after 10 years. Wherever possible, the farmers' training centres may be converted into KVKs. (9.15, 9.17 and 9.18)

58. The coverage of Lab-to-Land Project may be restored to its earlier strength, i.e. adoption of 75,000 small and marginal farm families and agricultural labourers by the research and educational Institutes. (9.21)

59. The Directorates of Extension Education of the SAUs should be strengthened adequately both by support from the ICAR and the State Governments. (9.23)

60. On the model of the Govind Ballabh Pant University of Agriculture and Technology, Communication Centres may be developed in other SAUs, including press, photo-labs, and recording studios for radio and television programmes. (9.26)

61. There should be greater participation of the respective State Governments in improving the transfer-of-technology programme, and district- and local-level co-ordination/management committees should be revitalized for regular and close interaction. (9.32 and 9.33)

62. The ICAR should function as a technical arm of the Ministry of Agriculture, and the latter should draw more freely from the personnel resource of the ICAR and the SAUs for their senior technical positions. (9.36)

63. There should be a Co-ordination Committee comprising the Director-General, ICAR, Secretary (Agriculture), Agricultural and Animal Husbandry Commissioners, senior officers of the level of DDGs from the ICAR, and the Adviser (Agriculture), Planning Commission, to discuss the problems of agricultural development and the research and extension support required for their solution. (9.37)

RESEARCH PLANNING, IMPLEMENTATION, MONITORING AND EVALUATION

64. The Commodity Institutes of the ICAR should become focal points for research relating to the mandated commodity or problem area at the national level which will include resident and co-operative research, the latter currently under the AICRPs. (10.17)

65. The Institutes of the ICAR like the CRRI, CPCRI, IVRI, etc., should be responsible to provide necessary technical backstopping in research and training to the Institutes/centres established in backward regions like North-Eastern States, the Andaman and Nicboar Islands, etc. Simultaneously efforts should be made to establish the required research infrastructure in these regions. (10.18)

66. The NRCs should become centres of excellence for the specific mission-oriented research and should collaborate with the AICRPs in solving the problems of national and regional importance. (10.19)

67. Wherever the NRCs and AICRPs related to the same commodity are located at different sites, the possibility of bringing them together administratively and technically should be examined. They should plan their programme together under the advice of the Research Advisory Committee and should ensure complementarity of research. (10.19)

68. All the NRCs should not be the Research Centres of the ICAR, but some of them could be considered as centres of the NARP of the SAUs if the programmes are of local importance. (10.21)

69. In single-commodity Institutes, the Director of the Institute should be recognized as the national leader and should co-ordinate research at the Institute and under the co-operative programmes. He should be assisted by the Joint Director for co-operative research in the place of Project Co-ordinator in the Institute who should be the co-ordinator of AICRP and should exercise complete control over budget, programmes, and travels. (10.32)

70. Wherever essential, another post of Joint Director (Resident Research) in the Institute should be created so as to free the Director to visit the centres of co-ordinated programmes and bring the field problems back to the Institute, thus facilitating upstream research. (10.33)

71. The primary functions of the Project Co-ordinator should be to monitor the work of the different centres, prepare plans for the new programmes, oversee the exchange of breeding material and information, and compile annual reports related to the project activities. However, he should be considered as an active working scientist at a higher level and should be encouraged to undertake research without competing with his research colleagues for recognition. (10.34 and 10.35)

72. The Project Co-ordinator should not be restricted to any one discipline. He should be the ablest man out of inter-disciplinary teams and should not be below the professor's level. He should be recruited at S-4 level on a tenurial basis. (10.36)

73. Proper norms should be developed on the basis of requirements of different disciplines for providing research contingencies. The ICAR should consider providing 30-40% non-salary costs for meeting all operational needs of research projects, and the Project Co-ordinator should be empowered to change allotment from one item to another, if necessary. (10.38)

74. It is necessary to cut down the periodicity of All-India Workshops, which may be held once in two years. A brief and to-the-point report on the contributions and achievements should be brought out at the Workshops and critically discussed. (10.42)

75. National-level testing programmes for technology evaluation or adoptive research programmes should be evolved jointly by the ICAR and the SAUs. (10.44)

76. From the Eighth Five-Year Plan, the funding policy for the AICRPs should be to reduce the ICAR support gradually, and ultimately make the SAUs responsible for funding these projects. (10.46)

77. The AICRPs started before 1 April 1981 should be reviewed by

a task-force to be sepcifically appointed by the ICAR for this purpose. (10.46)

78. The ICAR should develop a mechanism for ensuring minimum financial support to newer SAUs for research on similar lines as is being provided for education programmes so that they are able to create and maintain their research infrastructure and are capable of collaborating in the national programmes. (10.47)

79. The regional research competence of the SAUs in areas like fisheries, animal sciences, horticulture, post-harvest technology, etc., should be strengthened. (10.54)

80. The existing schemes of Professors of Eminence and National Fellows may be discontinued. However, for encouraging basic research in key areas financial support be provided to identified scientists. (10.61)

81. All research work carried out within the Institutes of the ICAR should be on "Project Basis" with the specific time and cost scheduling. (10.65)

82. At the national level, the ICAR should create a Standing Policy Planning Committee consisting of eminent scientists/persons (serving or retired) from the ICAR and SAUs system and from sister research agencies like the CSIR, ICMR, etc. The crucial role for this Committee will be research policy planning and goal-setting. (10.66)

THRUST AREAS

83. Increase productivity and efficiency of irrigated farming through greater emphasis on soil and water management primarily with labour-intensive methods.

    Rainfed farming and dryland technology to ensure stability and sustainability of agriculture and taking into account the socio-economic constraints of the areas.

Improving efficiency of inputs in agriculture and breaking yield barriers in wheat and rice and increasing productivity and stability of yield of pulses, oilseeds and *rabi* sorghum.

Intensification of research on management of biotic stresses on crops.

Research in processing and marketing.

Strengthening of research in less developed areas and problems of poor segments of agricultural population.

Conservation of plant, animal and fish genetic resources.

Genetic improvement of livestock—generation of breeding strategy and superior germpalsm.

Intensification of research on non-conventional feed resources.

Development and utilization of bio-technological innovations for animal production and health.

Increasing dairy production and reducing losses through proper processing.

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Increase production in culture fisheries both in freshwater and brackishwater

Develop systems of sustainable fish production from marine and inland waters. (10.6)

CHAPTER 1

CONSTITUTION OF THE COMMITTEE AND FUNCTIONAL PROCEDURES FOLLOWED

1.1 The Indian Council of Agricultural Research (ICAR) is a registered society. As an apex scientific organization, it has a very important role to play in the field of agricultural research and education in the country. The ICAR has made a valuable contribution in helping the country attain self-sufficiency in food production. It cannot, however, afford to rest on its past laurels and must equip and gear itself to meet the newer developments and challenges in the field of agricultural research and education. It is necessary that the mandate, structure and functioning of such an apex organization is periodically reviewed to enable it to respond more effectively to future challenges. For this in-depth study, the Union Minister of Agriculture, in his capacity as the President of the ICAR Society, set up a Committee under the Chairmanship of Dr G.V.K. Rao, former Member, Planning Commission, to review the existing organizational structure, personnel policies and functional role of the Council (vide Office Order No. 30-30/85-Estt., dated 6 April 1987). The composition and the terms of reference of the Committee are indicated below:

COMPOSITION

1.	Dr G.V.K.Rao, Former Member, Planning Commission, Bangalore.	Chairman
2.	Dr Y.K.Alagh, Member (Agriculture), Planning Commission, New Delhi.	Member
3.	Dr J.S.Kanwar, Deputy Director-General, International Crops Research Institute for the	Member

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	Semi-Arid Tropics, Patancheru, Andhra Pradesh.	
4.	Dr B.Misra, Deputy Chairman, Orissa State Planning Board, Bhubaneswar.	Member
5.	Dr K.S.Nandpuri, Director of Research, Punjab Agricultural University, Ludhiana.	Member
6.	Prof. R.C. Paul, Former Vice-Chancellor, Panjab University, Chandigarh.	Member
7.	Dr C.M.Singh, Former Director, Indian Veterinary Research Institute, New Delhi.	Member
8.	Dr G.S.Sidhu, Former Director-General, Council of Scientific and Industrial Research, Chandigarh.	Member
9.	Dr V.Kurien, Chairman, National Dairy Development Board, Anand.	Member
10.	Dr G. Rangaswami, Former Vice-Chancellor, Tamil Nadu Agricultural University, Salem.	Member

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11.	Dr V.A.Pai Panandikar, Director, Centre for Policy Research, New Delhi.	Member
12.	Dr R.M.Acharya, Deputy Director-General (Animal Sciences), Indian Council of Agricultural Research, New Delhi.	Member-Secretary

TERMS OF REFERENCE

1. To review the existing role and organizational structure of the ICAR and its Institutes and the State Agricultural Universities and to suggest appropriate modifications with a view to meeting the new challenges of agricultural production and raising productivity economically.

2. To review the institutional arrangements and to suggest improvements for augmenting national research facilities, revitalizing education and reorienting extension education mechanism.

3. To review the relative proportions of three kinds of research, viz. basic/fundamental, applied and operational/outreach.

4. To review the present linkages between agricultural research and extension and suggest arrangements for effective and expeditious application of new technologies for optimum utilization of resources.

5. To review the role of the ICAR in agricultural education through its own Institutes and the State Agricultural Universities with special emphasis on raising the standards of education and training.

6. To review the personnel policies with a view to attracting talent and building up the requisite technical expertise, especially in highly specialized but critical disciplines.

7. To review the linkages of the ICAR with various client departments and other organizations to facilitate inter-institutional functioning in

a complementary fashion with reference to national priorities.

8. To consider institutionalizing the participation of the Department of Agriculture and Co-operation in developing the research programmes.

1.2 The Committee held nine meetings. The dates and the venues of the meetings were:

	Date	Venue
1.	21 to 24 April 1987	New Delhi
2.	16 to 19 May 1987	Bangalore
3.	20 to 24 July 1987	New Delhi
4.	10 October 1987	Hyderabad
5.	21 to 23 December 1987	New Delhi
6.	1 to 4 February 1988	New Delhi
7.	17 and 18 February 1988	Bangalore
8.	7 to 9 March 1988	New Delhi
9.	24 and 25 March 1988	New Delhi

1.3 At its first meeting held in New Delhi from 21 to 24 April 1987, the Committee discussed the modalities to be adopted in collecting and evaluating the materials for its consideration and allocation of specific responsibilities to the members, keeping in view their expertise. Each member was requested to visit the concerned Institutes and State Agricultural Universities (SAUs) and discuss the problems relating to agricultural research, education and extension. The details of the Institutes and the SAUs visited by the members are indicated in Appendix I. In addition to meeting the Directors of ICAR Institutes, Project Co-ordinators of the All-India Coordinated Research Projects (AICRPs) and the Vice-Chancellors of the SAUs, the members met the Ministers of Agriculture and the senior officers in the States, viz. Agricultural Production Commissioners, and Directors of Agriculture, Animal Husbandry and Fisheries. The reports of the visits were circulated to all the members of the Committee and the major recommendations made in these reports were considered by the Committee at its regular meetings.

1.4 The Committee decided that Dr Alagh would act as the Vice-Chairman and preside over the meetings of the Committee in the absence of the Chairman. It was also decided to associate Dr K.V. Raman, Director, National Academy of Agricultural Research Management (NAARM), Hyderabad, to assist the Committee in its deliberations and also to act as its Joint Secretary.

1.5 The proceedings of the Committee meetings and the action taken thereon were circulated to all members and considered at the subsequent meetings.

1.6 The Committee also met the senior officers of the ICAR, viz. Director-General, Deputy Directors-General, Secretary, and Financial Advisor (DARE), and held discussions with them on the issues covered in the terms of reference. The Committee decided that its terms of reference should be notified to all the Vice-Chancellors of the SAUs, Directors of the ICAR Institutes and Project Co-ordinators of the AICRPs and they be requested to indicate the issues which the Committee should consider.

1.7 On the basis of the responses received from various sources, an 'issue paper' was developed and circulated to the Directors of the ICAR Institutes, Vice-Chancellors of the SAUs and Project Co-ordinators.

1.8 The Committee appointed Shri B.L.Kansal and Shri D.T.Gurnani (retired Deputy Secretaries to the Government of India) as Consultants to help the Committee by preparing analytical notes on the constraints in the autonomous functioning of the ICAR, the similarities and differences in structure and functioning — more particularly the rules, regulations and working procedures — between the ICAR, the Council of Scientific and Industrial Research (CSIR), the Indian Council of Medical Research (ICMR), the Department of Atomic Energy (DAE), etc. These notes were considered at the meetings of the Committee. The Joint Secretary, senior faculty members of the NAARM, and these Consultants assisted the Member-Secretary in finalizing the report of the Committee.

1.9 During the meeting at Bangalore in May 1987, apart from visiting the Indian Institute of Horticultural Research (IIHR), Regional Stations of the Indian Veterinary Research Institute (IVRI) and the National Dairy Research Institute (NDRI), the University of Agricultural Sciences, Raman Research Institute and the Indian Institute of Science, the Committee held discussions with the Minister of Agriculture, the Minister of Horticulture, Secretary (Agriculture) and the senior officers of the Departments connected with Agriculture, Horticulture, Fisheries, Animal Husbandry, etc., of the Karnataka Government. The Committee visited the Indian Agricultural Research Institute (IARI) in July 1987, and the NDRI, Central Soil Salinity Research Institute (CSSRI) and the IARI Regional Station at Karnal in December 1987.

1.10 The Committee during its meeting from 20 to 24 July 1987 held discussions with the Directors of the ICAR Institutes, Vice-Chancellors of the SAUs, the Secretary and other senior officers of the Department of Agriculture and Co-operation, senior officers of the Department of Rural Development, and Secretaries and senior officers of the Scientific Departments of the Government of India (Department of Science and Technology, Department of Biotechnology, Department of Ocean Development and Department of Environment, Forests and Wildlife) and Scientific Councils (CSIR and ICMR).

1.11 The Committee requested the Director, NAARM, to get questionnaires prepared for obtaining further responses from the Directors of the ICAR Institutes, the Vice-Chancellors of the SAUs, Project Co-ordinators and all the scientists from some selected Institutes.

1.12 Using the responses and suggestions received from various respondents and based on notes prepared by the Secretariat of the Committee, the NAARM developed detailed discussion papers on major issues for consideration in the National Workshop on Agricultural Research and Education Systems, organized by the Committee at the NAARM, Hyderabad, from 9 to 11 October 1987. Eminent public men associated with agricultural research, development and education, economists, journalists, agricultural scientists (retired and active, both national and international), selected Vice-Chancellors of the SAUs and senior officers of some State Governments related to Agriculture and Animal Husbandry numbering about 100 participated in the Workshop. The Workshop was inaugurated by the then Union Minister of Agriculture, Dr G.S. Dhillon, Shri C.Subramanian, former Union Minister of Agriculture, Shri A.P.Shinde, former Minister of State of Agriculture, and Shri N.G.Ranga, Member of Parliament, also participated and made significant contributions. The deliberations of the Workshop were of immense value to the Committee in finalizing its recommendations. A list of participants in the Workshop is at Appendix 2.

1.13 The Committee requested the Centre for Policy Research, Chanakyapuri, New Delhi, to conduct a study of the status, structure and functioning of the ICAR Headquarters in relationship to its Institutes and the SAUs. This report was considered by the Committee.

1.14 The Committee held detailed discussions with Prof. Yash Pal, Chairman, University Grants Commission, and all the three former Directors-General of the ICAR, namely, Dr B.P.Pal, Dr M.S.Swaminathan and Dr O.P.Gautam. The Committee also met Dr S.Vardarajan, Chief Consultant, Planning Commission, Dr J.S.P.Yadav, former Chairman, ASRB, Dr N.G.P.Rao, present Chairman, ASRB, and Dr K.Kanungo, Member, ASRB, and had the benefit of their views on various issues. The Committee also met Dr M.V.Rao, Special Director-General, ICAR. During its meeting at Bangalore, the Committee had also the benefit of the views of Prof. Satish Dhawan, former Secretary, Department of Space, Government of India, Dr H.A.B.Parpia, former Director, Central Food Technological Research Institute, Mysore; Dr N.N.Dastur, former Director, NDRI, Karnal; Dr K.K.Iya, former Deputy Director-General (Animal Sciences), ICAR; and Dr K.Ramiah, former Director, Central Rice Research Institute, Cuttack.

1.15 The Committee also met representatives of the Associations of Scientists of the ICAR (Agricultural Research Scientists' Forum, Association of Young ARS Scientists, etc.), Technical Officers, and Secretary, Central Joint Staff Council of the ICAR and took note of the points made out by them in regard to service conditions and working facilities.

1.16 The Committee requested six eminent scientists, viz. Dr A.B. Joshi, Dr H.S. Mann, Dr D.R. Bhumbla, Dr V.G. Jhingran, Dr M.R. Dhanda and Dr G.C. Juneja to do sectoral reviews of Crop Sciences, Forage and Arid Zone Research, Soil Science and Agricultural Engineering, Fisheries, Animal Production, and Animal Health. These scientists met the Committee and their reports were considered by it.

1.17 The report of the Committee is divided into the following Chapters:

1. Constitution of the Committee and Functional Procedures Followed.
2. ICAR Society : Constitution, Functions and Various Reviews — Historical.
3. Future of Agriculture — Challenges and Remedies.
4. Investments in Agricultural Research.
5. Organizational Structure of the ICAR to Fulfil its Mandates.
6. ICAR Institutes, their Role and Relations with the Headquarters.
7. Personnel Policies of the ICAR.
8. Linkages of the ICAR with State Agricultural Universities.
9. Transfer of Technology.

10. Research, Planning, Implementation, Monitoring and Evaluation.

1.18 The Committee has observed that there is a broad consensus among agricultural scientists and policy planners that there is scope for making improvements in the structure, functioning and management of the ICAR. The Committee has ventured to make a number of recommendations for improving the functioning of the ICAR and its Institutes. Recommendations have also been made on agricultural education and extension education (transfer of technology) both on the role of the ICAR as well as on the need for improving and strengthening these programmes.

1.19 The Committee would like to place on record its gratitude to the President of the ICAR Society and the Union Minister of Agriculture for reposing faith in it for doing this important review. It is grateful to the ICAR Headquarters for providing the necessary facilities. The Directors of the ICAR Institutes and the Vice-Chancellors of the SAUs deserve the Committee's gratitude for making arrangements for the visits of the Committee members, responding to the questionnaires, and taking part in discussions with the Committee. The Committee is also grateful to the large number of participants in the National Workshop at Hyderabad, and other senior persons who gave the benefit of their views to the Committee. It would also like to place on record the hard labour put in by the staff of the Secretariat of the Committee in organizing different meetings, keeping a record of the proceedings, preparing notes on various issues and in finalizing the report.

CHAPTER 2

ICAR SOCIETY : CONSTITUTION, FUNCTIONS AND VARIOUS REVIEWS — HISTORICAL

2.1 The Imperial Council of Agricultural Research (renamed the Indian Council of Agricultural Research after independence) was set up on 16 July 1929, as a Society registered under the Societies Registration Act, 1860. Till 1966, the ICAR did not establish any of its own research institutions. The schemes funded by the ICAR were executed mainly at the Central and State Research Institutes, Universities, private institutions, etc. Three full-time members were appointed by the Government of India to look after the day-to-day affairs of the ICAR. One of the members was an administrator, vested with overall powers of superintendence of the functions of the ICAR and was designated as the Vice-President. The other two members were designated as the Agricultural Commissioner and the Animal Husbandry Commissioner, representing the interests of crop production and animal husbandry (including veterinary matters) respectively. The Union Minister of Food and Agriculture was the ex-officio President of the ICAR.

2.2 The ICAR was initially charged with the responsibility of (i) promoting and co-ordinating agricultural and veterinary research, (ii) collecting and co-ordinating information in regard not only to research but also agriculture and veterinary matters, (iii) publishing scientific papers, and (iv) training research workers.

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2.3 The process of the growth of the ICAR, both structurally and functionally, has a chequered history, having been subjected to periodical reviews by a number of teams.

2.4 Two Joint Indo-American Teams were appointed by the Government of India, one in 1954 and the other in 1959. The first team made a large number of recommendations on research and higher education, including administration and personnel management. These recommendations inter alia laid emphasis on the methodology for the utilization of research funds of the ICAR, administration and control of the grant-funds, development of adequate research facilities by the States and their participation in schemes of regional or national significance, and development of national or regional centres in areas in which Centrally supported institutions could function more effectively than State research institutions.

2.5 The second Indo-American team also stressed upon the development of overall agricultural research programmes through (i) identification of research priorities, (ii) formation of an Agricultural Research Policy Council composed of high-level agricultural technical officers to serve as a Standing Advisory Committee to the Governing Body of the ICAR, (iii) strengthening of the co-ordination of all agricultural research programmes, and (iv) effecting necessary organizational changes, such as taking over of the Central Research Institutes as well as the Commodity Committees under the administrative control of the ICAR. The Committee also recommended that projects of regional or national significance and cross-commodity projects should alone be implemented by the ICAR, the responsibility for local research being left to the States.

2.6 In October 1963, the Government of India appointed an Agricultural Research Review Team with the specific object of enquiring into the agricultural research set-up in the country and suggesting necessary changes. This team made a number of important recommendations such as (i) replacement of the existing Council by a new Council for Agricultural and Food Research, with powers to develop and administer national research programmes, (ii) authorization of the new Council to assume full technical and administrative control of all the Central Agricultural Research Institutes and Commodity Committees and certain other research organizations then financed by the Government of India, (iii) taking over by the ICAR of other related institutions like the Central Food Technological Research Institute (CFTRI), and (iv) assumption of responsibility by the ICAR of all the extension activities in the country. This team also suggested that the IARI, NDRI and IVRI should be designated as National Institutes by giving greater autonomy in their functioning.

2.7 Based on the recommendations of the Research Review Team, the Government decided in March 1965 to reorganize the ICAR by way of (i) bringing under the ICAR all the Central Research Institutions, (ii) reconstituting the Governing Body by making it pre-eminently a body of scientists, (iii) giving financial assistance for research to the ICAR in the form of a 'block grant' on the model of the Atomic Energy Commission, (iv) agreeing in principle to the IARI, IVRI and NDRI being designated as National Institutes and taking up necessary legislation therefor, (v) adoption of a personnel policy on the lines suggested, and (vi) formation of a Cabinet Committee on Agricultural Research.

2.8 Following the aforesaid decision of the Government, the ICAR took over the administrative control of 9 Research Institutes on 1 April 1966; other Research Institutes were taken over in subsequent years. The ICAR also assumed the research functions of the Central Commodity Committees dealing with cotton, oilseeds, coconut, lac, jute, tobacco, sugarcane, arecanut, cashewnut and spices, together with the control of research stations and laboratories maintained by these Commodity Committees.

2.9 In June 1970, the Cabinet approved the proposal for the introduction of a legislation for (i) declaring the ICAR as an Institution of national importance, (ii) converting the ICAR into a Statutory Body, and (iii) conferring upon the proposed Statutory Body of the ICAR certain functions performed by the UGC in the field of agricultural education. However, before the said legislation could be introduced, the Government of India appointed in May 1972 an Enquiry Committee headed by Dr P.B.Gajendragadkar, retired Chief Justice of the Supreme Court and Hon. Chairman of the Law Commission, to enquire into the recruitment and personnel policies of the ICAR and to consider other relevant matters. This Committee made a number of recommendations such as (i) the ICAR should be made a Department of the Central Government, as the Department of Agricultural Research and Education (DARE), (ii) recruitment to scientific posts should be made through the UPSC, (iii) there should be an Advisory Council for Agricultural Research and Education, (iv) the DARE should have two Executive Committees — one for Agricultural Education and the other for Agricultural Research, (v) the posts of the Heads of Divisions in the Research Institutes should be held by Principal Scientists of the Divisions on rotational basis, (vi) the staff in the Research Institutes should be classified into 4 categories — scientific, technical, administrative and supporting — and their service conditions should be improved.

2.10 Following the decision of the Government on the recommendations of the Gajendragadkar Enquiry Committee, the DARE was set up in December 1973. The ICAR was retained as an autonomous society so as to confer necessary operational and functional autonomy in the organization of research and education. Management Committees were set up at each Research Institute with the functions as envisaged by the Enquiry Committee for the proposed Executive Councils. For the selection of scientists, an independent recruitment agency, named Agricultural Scientists Recruitment Board (ASRB), was created on the pattern of the UPSC. An Agricultural Research Service (ARS) was constituted in the ICAR inter alia providing for recruitment of scientists on a centralized basis and their career advancement to higher grades on the basis of the principle of flexible complementing, irrespective of the occurrence of vacancies. A number of functional and structural changes were also made in the ICAR after its reorganization in 1973-74. It was envisaged that the reorganized ICAR should be endowed with adequate financial, administrative, operational and functional autonomy so that it could discharge its responsibility more effectively. The working procedures and regulations of the ICAR were modified so as to make it free from non-essential restrictions and inelastic rules. The ICAR was delegated powers to formulate policies, develop programmes, and ensure their implementation. The constitution of the General Body and Governing Body was changed to meet the functional needs. A Norms and Accreditation Committee was set up in the ICAR mainly to determine the norms of financial assistance by the ICAR to the SAUs. Scientific panels were set up to consider schemes and projects relating to their respective disciplines and to advise the Governing Body on technical matters. Inter-disciplinary Panels and Joint Panels of the ICAR with other scientific bodies like the CSIR, ICMR, ICSSR, etc., were also set up for collaborative research and interdisciplinary examination and implementation of the projects. Eight Regional Committees were set up, based on 8 broad agro-ecological regions of India. At the Institute level, Management Committees were set up to consider Plan schemes and policy issues, apart from conducting periodical review of the progress of research schemes and proposals for annual budget, and purchase items. A system of 'block grant' to be made by the Government in favour of the ICAR was also introduced with considerable powers for reappropriation.

2.11 In February 1981, a Committee was set up under the chairmanship of the late Shri Chandrasekhar Singh, MP, and a member of the Governing Body, to review the financial and administrative working of the ICAR and to make suggestions for improvement. This Committee identified the constraints in the working of the ICAR and made a number of recommendations aiming at improving the working procedures such as monitoring the research progress, reorganization of the financial set-up, and enhanced delegation of powers to Directors for better functioning of the Management Committees at the Institute level.

2.12 For implementing its research policies and programmes, the ICAR has developed a national grid comprising (i) Central Research Institutes, (ii) National Research Centres, (iii) All-India Co-ordinated Research Projects (AICRPs), (iv) State Agricultural and General Universities, and (v) voluntary organizations. In discharging its role as a National Co-ordinating Agency in the field of Agricultural Research, the ICAR has also established linkages with the Planning Commission, DST, CSIR, ICMR, ICSSR, DAE, etc., on the one hand and International Research Organizations and Institutes, FAO, UNDP, World Bank/IDA, Asian Development Bank, etc., on the other. The ICAR has also a regular link with the SAUs and their research network in the country through the AICRPs, through senior scientists and ICAR nominees on the Management Boards of the SAUs, and through the representatives of the SAUs on various ICAR bodies. The ICAR also maintains a close working relationship with the University Grants Commission inasmuch as the ICAR discharges the functions of the UGC with regard to agricultural universities. The ICAR is also represented on the Boards of many related Departments such as the Department of Ocean Development (DOD), Indian Meteorological Department (IMD), Department of Biotechnology (DBT), Department of Non-conventional Energy Sources (DNES), etc. It is through these linkages that the ICAR has been able to co-ordinate its activities to provide support not only to organizations involved directly in agricultural research but also to those working in allied fields, thus contributing to the rapid growth of agriculture in India and the integrated functioning of agricultural research, education and extension education.

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CHAPTER 3

FUTURE OF AGRICULTURE - CHALLENGES AND REMEDIES

3.1 The agricultural scenario all over the world is undergoing a rapid change. From the status of being a subsistence occupation to meet the food and fibre needs of the farmer and his family, or at best of his immediate neighbourhood, farming has tended to become an occupation, industry or business. Advances in agricultural technology have contributed to increased production at the farm level, contributing to the income and prosperity of the farmer. Agriculture has been, and will remain, the most crucial factor in India's development. The importance of the agricultural sector gets engraved in the public mind by its performance in the food front, but its impact does not end there. The agricultural sector plays a very significant role in providing employment, generating income, supplying fuel and fibre, producing raw materials for the industry and earning foreign exchange for the country.

3.2 In recent years, the use of better technology and higher investment in agriculture in some of the developing countries is becoming a notable feature of their economic growth as in the case of India.

3.3 Agricultural development in India will be critical to various other sectors of activity including generation of employment and alleviation of poverty in the rural sector. The cost of creating jobs in industry is infinitely higher than producing jobs in agriculture. Lack of dynamic agriculture will lead to rural violence, and agriculture cannot therefore be neglected. As Pandit Nehru proclaimed, "Anything can wait but not Agriculture".

3.4 Agricultural change in this country has been complex. The scientific breakthroughs which heralded the era of the green revolution have yielded spectacular results. Agricultural production has increased at a compound growth rate of about 2.5% per annum over the last three decades. Foodgrain production has increased from 50.8 million tonnes in 1950-51 to 144.1 million tonnes in 1986-87 with a peak of 152.4 million tonnes in 1983-84. Judging by historical as well as contemporary records, such a sustained growth, despite wide fluctuations caused by vagaries of weather, is commendable. Much of this gain has however been neutralized by stupendous growth in population from 361 million in 1951 to 685 million in 1981 with the result that growth in per capita terms is lower. In addition to foodgrain production, substantial increases have also occurred in the production of a number of non-cereal and commercial crops, animal products, fisheries, cotton, wool and other fibres and a variety of commodities that are basic to living. The total oilseeds production increased from 5.2 to 11.4 million tonnes in 1986-87, cotton from 3 to 7 million bales, sugarcane from 57 to 182.4 million tonnes, potato from 1.7 to 12.7 million tonnes and jute from 3.3 to 7.3 million bales. During the same period, milk production increased from 17 to 44.5 million tonnes, eggs from 1032 to 16,518 million numbers and fish from 0.75 to 2.94 million tonnes.

3.5 The new technologies that have been developed during this period have enabled many small farms to cross the threshold of non-viability. The rise in employment opportunities on on-farm and ancillary enterprises have contributed to increases in real wages. The agricultural strategy developed by policy makers till our Sixth Plan was more concerned with growth and rapid increase in production, particularly in foodgrains. Beleaguered by recurrent and sometimes acute shortages in foodgrains availability, their inflationary and inegalitarian consequences and hostile climate for food aid, this accent on foodgrain production was wholly legitimate, even though this caused some inter-and intra-regional imbalances due to variations in growth potentials. Part of this was due to the need for a dynamic enterpreneurship required for the full exploitation of the growth potential envisioned by the newer agricultural technology for accelerated production.

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3.6 After reaching a level of about 150 million tonnes, agricultural production has reached a plateau for the last few years. There is a need to accelerate growth to meet the challenges of the future. Complacency in this regard could be a great danger. Since a large proportion of our rural population will continue to depend upon farming, greater research and developmental efforts to maximize agricultural production should be made. The planning should be at the micro-level involving each agro-ecological region, and for that purpose the research results should get closer to the land. The whole approach of the agricultural planning should be decentralized and location-specific. A malady-remedy analysis coupled with carefully designed constraint analysis should be made for each one of these regions so that effective steps could be undertaken to overcome these specific problems. The thrust for increased production in areas of higher growth potential envisaged in the recent Planning Commission's approach to achieve the Seventh Plan targets of producing about 175 million tonnes of foodgrains is a step in this direction.

3.7 There can also be no denying the fact that land and natural resources are limited in volume even when they are renewable; and there is certainly a specific limit to the area of cultivable land that a country has. Land will continue to be a more intense constraint in the Indian economy than perceived hitherto. The ecological substainability of the production system has to be carefully monitored and evaluated. Agricultural development should also take into account not only the positive aspects of economic growth in terms of maximizing incomes and employment, but also in terms of its negative effects on the stock and continuity of natural resources, and the quality of the environment. The entire biosphere is under severe stress. The production base for sustained agriculture which includes land and soil, flora and fauna and the balancing forces of nature is getting severely eroded. Increases in production, which had been the primary goal of agriculture in the most recent past, have played havoc with our natural systems. Deforestation, denundation, desertification, recurring floods, loss of top-soil, degeneration of land, disposal of wastes and effluents damaging the quality of our water resources and marine wealth, all these and other environmental damages, both domestic and imported, are a growing constraint to agricultural production. This may be kept in view while making concerted efforts for improving agricultural production to cross the barrier of poverty and enter on a course of economic growth. The Commission on Environment and Development, chaired by Mrs Gro Harlem Brundtland, Prime Minister of Norway, in its report submitted to the United Nations last year has stressed that the security, well-being and the very survival of our planet depends on changes in development strategies and ethos that would include a land ethic for the protection of our land resources and a global germplasm ethic for the conservation and utilization of genetic variability in economic plants. Conservation of soil as well as the genetic resources of plant, animal and fisheries are imminent to restore this ecological balance. Diversification of crops and development of appropriate cropping and farming systems to suit them need to be developed on a more scientific basis.

3.8 The extent of irrigation, expressed as percentage of irrigated to gross cropped area, has practically doubled in the three decades after independence. However, the cropping intensity utilizing this irrigation potential has gone up at a less satisfactory rate. The performance of the irrigated sector has also been less satisfactory in spite of the fact that the demonstrated potential is nearly three times the achieved production. Problems of conveying water to the field with minimum seepage and evaporation losses, waterlogging caused by inadequate and inappropriate drainage systems, and salinity and alkalinity development by misuse and overuse of water, continue to plague this sector. Scientific water management including conjunctive use of water resources would underline the future strategy in this regard.

3.9 Agricultural production processes need to be critically examined. The days of inefficient agriculture are over. An increased production system where a cost reduction is not synonymous with yield reduction has to be developed. The efficiency of inputs, specially the purchased ones, will have to be increased and the synergistic output of the whole series of activities involving inputs and management have to be developed by adopting a systems approach.

3.10 Equity issues will assume greater significance and importance in the years to come. The changing scenario in the world on economic sustainability and social milieu demand greater attention to be paid to problems like the size of holdings, gender issues and a host of other social factors. Resources utilization for optimization of output will have to be on a more integrated basis. Farming systems research involving a holistic approach to farm activities will have to receive greater emphasis.

3.11 Equity issues will also focus attention on marketability of agricultural products, including value-added goods, and we will have to ensure that the small farmer and small producer are not affected by the non-availability of an appropriate marketing infrastructure. In addition to agriculture, agro-industries in terms of income, employment and utilization of agricultural by-products need to be developed. The processing industry associated with the agricultural sector has been far from efficient. Increased attention needs to be paid towards post-harvest technologies including processing of agricultural commodities, production of value-added products, more efficient utilization of by-products and cost reduction in production and processing technologies. Policy planning in this regard would require greater attention.

3.12 The agriculture of tomorrow require basic support from new emerging areas of sciences. The ICAR will have to focus attention on futurology or "research for tomorrow" distilling out of the emerging science usable and useful information from advances made in the areas of "New Science". In developing countries like India, capital will continue to be scarce, whereas human resources and knowledge will be abundant. Substituting knowledge for capital will have to be carefully exploited, wherever possible.

3.13 The changing agricultural scenario around the world in terms of production and consumption of foodgrains and processed foods would open up ample opportunities for international agriculture and trade participation. This is a practically non-exploited area in Indian agriculture today. The entry into this area would require adequate market research, genetic manipulation of crops and livestock to suit the varying needs and requirements and a marketing infrastructure to promote this potential. The ICAR will have to address itself to this problem effectively in the years to come.

3.14 There is a need to develop a consciousness towards agriculture at all levels of education and training. The demographic analysis of the existing population indicates that the younger population will be the greatest contributors to the country's progress in the next two decades. In most developing countries, over 50% of the population is below the age of 20. What today's young girls and boys will or will not do in another 10 years will determine the future of the 21st century inhabitants of the earth. The utilization of this manpower by appropriate education and training shall be one of the concerns of the ICAR in the coming years. This education should start at the primary school level and should continue through higher education. Such a programme should provide opportunities for learning by doing and could involve such assignments as participation in the establishment of biosphere reserves and national parks, conservation of biodiversity at the local level, managing village forests, gathering ground-truth data for the interpretation of satellite imagery, social forestry, and protection of the health of the soil, water and atmosphere. Such a compulsory "Earth Service" to be purposeful should be intellectually stimulating in addition to being emotionally satisfying.

3.15 The input supplies of agriculture, specially seed, fertilizer, pesticides and water, will have to be done on a more integrated basis. Diversification of agriculture to include fruits, vegetables, livestock and dairy products will require a substantial research input to ensure its stability and sustainability. The pricing policies will have to be more sound and reasonable taking into account regional variations in production and productivity. Research support in these areas will eliminate adhocism in decision-making and policy-planning.

3.16 The projection of the future requirements of foodgrains and cereals to meet the needs of the ever-increasing population appears to be a challenging task to fulfil. The earlier projection of the National Commission on Agriculture was put at 228.5 million tonnes by 2000 A.D. Conform-ing to the above requirement, the Seventh Plan projection of foodgrain production was put at 178-183 million tonnes. Varying estimates of this demand have been projected in several other later studies. The current figures exceed these projections of the National Commission on Agriculture in view of the increases in the growth of population as well as rise in the living standards. These increases in production will have to come only from productivity gains as there is little additional area that can be brought under the plough. Increasing the intensity of cropping to levels much higher than at present is therefore a must.

3.17 Stability in agricultural production that will mitigate the effects of natural calamities like droughts and floods will have to be achieved. While it is a refreshing trend to see that each succeeding drought year has seen a higher production level than the previous one‘ we need to ensure higher levels of stability by "drought-proofing" techniques. Research on crop-weather interactions and on long and short-term weather forecasting will probably assist us to develop such an objective.

3.18 The transfer of research to the field for increased output needs to be further augmented as only a small part of available technology gets transferred to the field. A proper orchestration of research, extension, training in the use of developed technology, input supplies, credit availability, and Governmental policies in this regard is necessary to achieve optimization of output. This has to be necessarily supported by a demonstrated political will.

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3.19 The role of the ICAR in contributing to this development process will be important and significant. The ICAR will have to play a major leadership role stimulating research in the above areas, promoting ideas and ensuring research support to activities that will contribute to overall agricultural development. This role is an unenviable but a challenging one.

3.20 In wheat, a large part of the area is irrigated and almost the entire irrigated area is covered by high-yielding varieties. We will have to target for a major breakthrough in germplasm and for varieties which can give an average of 4 to 5 tonnes of yield. Increased quality considerations including emphasis on durum wheats, as also higher yield in some areas which are ecologically difficult areas for wheat production will also need attention. A major breakthrough will be required for discovery of appropriate technologies particularly in flooded areas and upland areas for paddy. The rice research programme in difficult conditions has not received adequate attention and will need to be strengthened. In sugarcane and oilseeds the experiments underway on the biotechnology front are making good progress and the Eighth Plan should provide for possibilities of getting into the extension phase from the R&D adaptation phase. Oilseeds and dryland agriculture research strategies will need to be pushed with vigour.

3.21 The irrigation sector will require a massive effort on modernization programmes and on improvement of delivery systems. Computer-compatible techniques for better operation of reservoirs, improved delivery systems with electronically regulated operations of canals to minimize distribution losses, and econometrically estimated demands for crop water requirement arising from behavioural studies of farmers' responses to the availability of irrigation water should all become the target of average practice. Irrigation engineers will have to be trained to societal and farmer requirements, rather than operating bureaucratic schemes of "sanction of crops". Computer-oriented conjunctive-use models for integrating groundwater with surface-water availability will need to become the standard practice to avoid waterlogging and to maximize the availability of water for consumptive use.

3.22 On watershed development side there is at present considerable confusion. Plan schemes with verified expenditure ratios per hectare of treated land exist. The most expensive schemes are of the World Bank and externally funded projects. These have top-heavy administrative systems and a low teeth-to-tail ratio. There are also the National Watershed Development Project, State-level Watershed Development Projects, Watershed Development Schemes, Catchment Areas of large irrigation projects and Watershed Development Works in DPAP and Desert Area Development Project Agencies. At the instance of the Planning Commission a Cell has been set up in the Department of Agriculture to prepare a co-ordinated plan for such schemes. The Ganga Flood Control Commission and the Brahmaputra Flood Control Board have also been instructed to monitor all such schemes in the respective river basins. Preliminary analysis shows that the highest success rates have been achieved when funds have been allocated to voluntary agencies after insistence of some input from the people who are benefiting from the projects. In these projects the benefit : cost ratios are high and the expenditure per hectare is also of a magnitude such that a major attack can be made on the problem in the last decade of this century. The Eighth Plan should provide a planning framework for the gigantic task of watershed development scheme to improve the carrying capacity of the fragile dryland areas.

3.23 The scheme of agroclimatic planning for regions should be operationalized. It is proposed to set up business-like planning groups for each region headed by a University Vice-Chancellor and consisting of Agricultural Production Commissioners, scientists and representatives of financial institutions in the area. The National Committee will provide back-up papers of a technical nature, information on national objectives in a quantified manner and information on resource constraints of rupee and foreign-exchange resources from the Central Sector Plan. Beyond that the agroclimatic region team will be expected to develop an optimal cropping pattern for crop husbandry, appropriate schemes for land and water development in the region, schemes related to animal husbandry, forestry and fishing, and policies and schemes for modern agro-processing and agricultural marketing.

3.24 A major emphasis will have to be laid in the plan in introducing quality considerations in the agricultural and related sectors. Price policy will have to give signals for improved quality production rather than operating in the opposite direction. At present, for example, quality differentials in paddy prices are going down and inefficient sugar producers are getting higher returns. Exports will have to be emphasized and a strategy developed for improved agro-processing and marketing techniques. The Plantation Sector will have to be re-enforced in terms of its contacts with world markets rather than subjecting it to substantial domestic distortions as at present in case of tea, rubber and declining productivity in spices, etc. Higher priority will have to be given to the needs of export markets and macro-economic policies of restricting exportable surpluses on the basis of inflationary fears resisted. In sectors like marine products much greater emphasis on modern technology developments will need to be laid to take advantage of world market booms. In the whole area of processing around forest-based products, modern technologies which process by-products and wastes of agricultural residues and are energy-efficient, will need to be looked at very carefully and structured subsidies provided in the light of the country's real resource scarcities. In some areas of the country like northern Bihar, eastern Orissa and adjoining areas of Andhra Pradesh, detailed work shows that landlordism will be a stumbling block to any effective policy of widespread agricultural growth. A decisive political attack will be needed to create the preconditions of a peasant-based agricultural economy in these areas. It may be noted that feudal obstacles to agricultural development were smashed in almost all cases of successful industrial growth.

CHAPTER 4

INVESTMENTS IN AGRICULTURAL RESEARCH

GROWTH IN CROPS AND LIVESTOCK PRODUCTION

4.1 Due to the concerted and planned efforts to increase agricultural production, there has been a spectacular increase in the production of crops — specially of foodgrains, potato and sugarcane — in the last three decades. The production of livestock products and fish has also recorded a significant and sizeable increase. During the period 1950-51 to 1986-87, milk production increased by 162%, egg production by a phenomenal 1,500% and fish production by 292% (Table 1).

4.2 What is significant is that a large part of the increases in agricultural production was due to the growth in productivity, rather than from area expansion. The index of agricultural production grew at an average annual rate of 2.8% between 1951-52 and 1986-87. In the same period, the index of agricultural productivity increased at an annual growth rate of 1.7%, while the growth rate in the index of area under crops was only 0.9% per annum. In the same way, milk production increased at an annual growth rate of 2.7% between 1950-51 and 1986-87, while the growth rates in egg and fish production were even higher at 7.9% and 3.5% per annum respectively.

ROLE OF RESEARCH AND TECHNOLOGY IN INCREASING PRODUCTIVITY

4.3 Research generates new knowledge and materials, and technology applies them to increase production and resource productivity. The large increases in production of foodgrains, fibre, fish and livestock products have come about because of the efforts made by the agricultural scientists, extension agencies, credit and other input agencies, and the creation of infrastructural facilities like storage, transport and marketing. The scientists need to be congratulated for their efforts in contributing to these phenomenal increases.

4.4 Since independence, the agricultural research system in the country has expanded quite fast, and research resource allocations have become issues of prime importance. But the problems of measurement of return to investment in agricultural research are beset with serious difficulties, both conceptual and practical. Lack of suitable information based on key variables adds another dimension to this difficult task.

ESTIMATES OF INVESTMENTS ON AGRICULTURAL RESEARCH

4.5 Mohan, Jha and Evenson (1973) compiled the estimates of expenditure on agricultural research in India during the period 1950 to 1968 (Table 2 and Fig.1). At constant 1968 prices, the estimated annual expenditure on agricultural research increased from Rs 5.62 crores in 1950-54 to Rs 16.42 crores in 1965-68. As a percentage of the value of agricultural production, research investments increased from 0.07% to 0.17% during this period.

4.6 No such estimates are compiled for the subsequent period. However, the estimates of expenditure incurred during the Sixth Plan period by the ICAR (Rs 55.98 crores) and different State Governments through the SAUs (Rs 611.74 crores) are available. The combined expenditure of Rs 1,162.72 crores must have been utilized for research, education and, to a limited extent, extension activities. About 25% of this expenditure could safely be attributed to education and extension activities. Thus, we arrive at an estimate of Rs 872.04 crores as the expenditure on agricultural research during the Sixth Plan period. The Gross National Product (GNP) generated during the Sixth Plan period was 8,45,867 crores, and about 35% of it (Rs 2,96,053 crores) was estimated to have originated from the agricultural sector. Thus the estimated expenditure on agricultural research was only about 0.3% of the income generated from the agricultural sector. It reflects only a small improvement over the figure of 0.17% estimated by Mohan et al. for 1968.

COUNTRY'S R & D BUDGET

4.7 For the sake of comparison, the expenditure incurred by the country on the Research and Development (R & D) activities during the period 1948-49 to 1985-86 is presented in Table 3. The R & D expenditure, which was only Rs 1.1 crores in 1948-49, has increased phenomenally to Rs 2,180.63 crores in 1985-86. The share of R & D expenditure as percentage of GNP at current market prices increased by 17 times from 0.054 to 0.90%. The concern of Policy Makers for R & D and Science and Technology (S & T) is very well reflected in these increases in financial allocations. However, the share of R & D in the GNP is much higher in other countries like the USSR (4.7% in 1983), USA (2.8% in 1984), Japan (2.6% in 1983), China (1.0% in 1987) and South Korea (1.04% in 1983).

4.8 The comparison of percentage shares of R & D expenditure in the GNP is not quite valid, because of the large differences in the levels of GNP. For instance, the GNP of the USA was $ 2946 billion in 1981 and 2.8% of it spent on R & D works out to $ 82.49 billion. In contrast, India's GNP was only $ 177 billion in 1981 and the R & D expenditure of 0.68% works out to a mere $ 1.20 billion. It implies that on R & D the USA spent about 69 times the amount spent in India. Even China is spending about $ 3 billion on R & D activities and it is about 2.5 times the amount spent by India.

4.9 There are some important facts emerging out of the statistics presented so far. In 1950, about 0.05% of India's GNP was spent on R & D activities. Similarly, the expenditure on agricultural research was about 0.07% of the value of agricultural production. The share of R & D expenditure in the GNP went up to 0.40% in 1986, but the expenditure on agricultural research moved up to only 0.17% of the value of agricultural production. The share of R & D expenditure further went up to 0.90% of the GNP in 1985-86. But the expenditure on agricultural research formed only 0.03% of the value of agricultural production even during the Sixth Plan period.

4.10 Initially, all the R & D expenditure was borne by the Central Government alone. But subsequently, the State Governments and private sectors have also started contributing to R & D efforts. But even in 1985-86, the share of the Central Government in the R & D expenditure was as high as 77.8% with the State Governments and private sector contributing 9.2 and 13% respectively. In contrast, State Governments accounted for about 52% of the expenditure on agricultural research in the Sixth Plan period, with the ICAR accounting for the remaining 48%. No estimates of private sector investments on agricultural research are available.

RELATIVE SHARES OF SCIENTIFIC ORGANIZATIONS

4.11 The Central Government expenditure on major scientific organizations of the country along with their percentage share in the total expenditure are given for selected years in Table 4 and Figs 2 and 3. The share of ICAR which had increased from 20% in 1958-59 to 22% in 1980-81, dropped to 12% in 1984-85. Over the years, the share of the Department of Atomic Energy decreased sharply, while those of Space and Defence Research increased considerably. The combined share of the CSIR and DST remained more or less the same between 1970-71 and 1984-85. During the Seventh Plan period, the ICAR has been given a Plan outlay of Rs 425 crores out of the total allocation of Rs 3,041 crores made for Research and Development activities (excluding the allocations made to Defence Research). The share of the ICAR is only 14%, and if allocation to defence research is also included, it may even fall short of 12%. These statistics reveal that the investment in agricultural research is being increasingly reduced and not adequate in terms of budget allocations. This trend is sharply evident in the eighties. When the country has to face the tall challenge of producing about 240 million tonnes of foodgrains by the turn of the century, such a complacent attitude may not be in the best interest of the country.

RETURNS TO INVESTMENTS IN AGRICULTURAL RESEARCH

4.12 While arguing for higher allocations, it needs to be established that the investments already made on agricultural research have benefited the society and yielded a reasonable rate of return. Three general approaches, namely, the Cost-Benefit analysis, the Total Factor Productivity and Index Number approach and the Production Function approach, have been used for ex post evaluation of agricultural research. Cost-Benefit analysis relates observed productivity gains in production of a particular commodity to the research expenditure on it. This technique has a tendency to overestimate the returns to research and is not adopted by many researchers. Total Factor Productivity attempts to measure the productivity growth rate as the difference between the growth rate of output and the growth rate of total inputs. The productivity growth rate is further subdivided into a measurable set of qualitative improvements and factors augmenting technical change. Using this approach, Evenson and Jha (1973) estimated the annual rate of return from investment in agricultural research in India to be 40% for the period 1953-54 to 1970-71 (Table 5). Arguing that this approach measures only partial returns to investment in research, Kahlon et al. (1977) used the Production Function approach and measured the annual rate of return from investments in Indian agricultural research to be 63% for the period 1960-73. Table 5 contains the estimates of returns from investments in agricultural research for some other countries also. The estimated rates of return for India compare favourably with those estimated for other countries. High rates of return from investments in agricultural research imply that the research expenditures have been suboptimal and they can be raised to higher levels profitably.

SOME INTERNATIONAL COMPARISONS

4.13 It was brought out that the expenditures on agricultural research formed only 0.30% of the value of agricultural output in India. Table 6 and Fig. 4 contain data on research/extension expenditure as a percentage of the agricultural production in different continents in 1974. It can be seen that the expenditure on research has ranged from 1.21 to 1.85% in the developing continents of Asia, Africa and Latin America, while it was higher, ranging from 1.83 to 2.72% in the developed continents of Europe and North America. These data also underline the need for increasing the allocations to agricultural research in India.

4.14 The estimated number of scientists in the National Agricultural Research System is about 28,000. Thus there are 131 scientists per million hectares of cropped area in the country. For every one million agricultural labour force, there are 108 scientists, and only 45 scientists are there to serve one million agricultural population.

4.15 Based on the evidence so far presented, the following conclusions may be drawn.

(i) The share of the R & D budget has steadily gone up to 0.90% of the GNP at the current market prices. But the expenditure on agricultural research formed only 0.30% of the value of income generated in the agricultural sector.

(ii) The share of the ICAR in the Central Government's R & D expenditure decreased sharply in the eighties.

(iii) The returns to investments made on agricultural research in India have been quite high and compare favourably with the corresponding figures for other countries.

(iv) The investments made on agricultural research as a percentage of value of output is probably the lowest for India, as borne out from the comparative figures for different continents.

(v) The ratios of agricultural scientists to million hectares of cropped area or million number of agricultural labour or million number of agricultural population are quite low.

(vi) At present, the country is spending only Rs 7.70 on agricultural research per hectare of cropped area in the country, and it is quite low compared to the benefits flowing from it.

4.16 While analysing the overall economic impact of the agricultural sector in the developing countries, John Miller emphasized that unless agriculture gets a better deal in future, it may not be possible to solve the employment problem in these countries. Therefore, there is a strong case for increasing the investment on agricultural research in the country. As a first step, the allocation of funds to agricultural research may be increased in the remaining years of the Seventh Plan. In the Eighth and subsequent Plans, there should be a substantial increase in the allocation to agricultural research by the Government.

Table 1. Production of principal crops and livestock products

Crop	Unit	Year	
		1950-51	1986-87
Rice	Million tonnes	20.6	60.4
Wheat	Million tonnes	6.5	45.5
Sorghum	Million tonnes	5.5	8.9
Maize	Million tonnes	1.7	7.4
Total cereals	Million tonnes	42.4	132.3
Chickpea (gram)	Million tonnes	3.6	4.4
Pigeonpea (arhar)	Million tonnes	1.7	2.3
Total pulses	Million tonnes	8.4	11.7
Total foodgrains	Million tonnes	50.8	144.0
Groundnut	Million tonnes	3.5	6.0
Mustard	Million tonnes	0.8	2.6
Total oilseeds	Million tonnes	5.2	11.4
Cotton	Million bales of 170 kg each	3.0	7.0
Sugarcane	Million tonnes	57.0	182.4
Potato	Million tonnes	1.7	12.7
Jute	Million bales of 180 kg each	3.3	7.3
Milk	Million tonnes	17.0	44.5
Eggs	Million Nos.	1,032	16,518
Fish	Million tonnes	0.75	2.94

Table 2. Estimates of Indian agricultural research expenditures (crores of rupees at constant 1968 prices)

Years	Average annual expenditure				Research spending as percentage of agricultural production**
	Crop research	Livestock research	Speciality crops*	Total	
1950-54	3.71	1.21	0.70	5.62	0.07
1955-59	5.29	2.11	1.00	8.40	0.10
1960-64	8.63	2.73	1.11	12.47	0.13
1965-68	12.27	3.00	1.15	16.42	0.17

* Includes coconut, tea, arecanut, lac and jute. Other crops included in crop research.

**Approximated from Indian Agriculture in Brief.

Source : Rakesh Mohan, Jha, D. and Evenson, R., 1973. The Indian Agricultural Research System. Economic and Political Weekly, Vol. 8, No. 13; pp. A-21 to A-26.

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Table 3. Expenditure on R & D, 1948-49 to 1985-86 (including Science and Technology)

Year	Expenditure (Rs, crores) Central Government	State Governments	Private sector	Total	Total R & D expenditure as percentage of GNP at market prices
1948-49	1.10	NA	NA	1.10	NA
1950-51	4.68	NA	NA	4.68	0.054
1955-56	12.14	NA	NA	12.14	0.12
1958-59	27.66	1.00	0.15	28.81	0.21
1965-66	79.12	3.51	2.43	85.06	0.36
1968-69	109.60	11.99	9.85	131.44	0.40
1969-70	121.26	12.22	12.81	146.29	0.40
1970-71	146.20	12.58	14.59	173.37	0.43
1971-72	159.07	9.53	16.18	184.78	0.43
1972-73	189.05	22.11	22.84	234.05	0.49
1973-74	199.05	22.13	30.35	253.53	0.43
1974-75	258.92	28.65	36.46	324.03	0.47
1975-76	323.70	31.94	42.35	397.99	0.54
1976-77	310.49	32.05	48.42	390.96	0.49
1977-78	355.53	36.50	58.20	450.23	0.50
1978-79	431.81	51.01	75.87	558.69	0.57
1979-80	523.43	58.76	92.14	674.33	0.63
1980-81	617.22	75.73	120.69	813.64	0.64
1981-82	765.15	91.30	147.00	1003.45	0.68
1982-83	936.57	121.86	196.98	1254.96	0.76
1983-84	1082.28	150.90	207.83	1441.01	0.76
1984-85	1474.98	178.85	236.75	1890.58	0.89
1985-86	1696.22	200.31	284.10	2180.63	0.90

NA, not available. Source : Basic Statistics Relating to the Indian Economy, Volume 1, All India, August 1987. Centre for Monitoring Indian Economy, Bombay.

Table 4. Expenditure on major scientific organizations of the country in some selected years

	Agency/Department	Rs, crores				Percentage to total			
		1958-59	1970-71	1980-81	1984-85	1958-59	1970-71	1980-81	1984-85
1.	Indian Council of Agricultural Research	3.72	18.37	97.45	131.09	20	21	22	12
2.	Council of Scientific and Industrial Research	5.10	21.56	69.00	146.48	27	24	16	13
3.	Defence Research and Development Organization	1.50	17.55	79.70	225.40	8	20	18	21
4.	Department of Atomic Energy	7.76	28.72	73.45	213.75	41	32	17	19
5.	Indian Council of Medical Research	0.51	2.18	9.00	19.47	3	2	2	2
6.	Department of Science and Technology	0.22	0.84	40.64	125.55	1	1	9	11
7.	Department of Space	-	-	56.02	176.46	-	-	13	16
8.	Other agencies	-	-	13.15	65.81	-	-	3	6
	Total	18.81	89.22	438.41	1104.01	100	100	100	100

Source : R & D Statistics, 1984-85. Department of Science and Technology, Government of India, New Delhi.

Table 5. Estimated rates of return from investment in agricultural research

Commodity	Country	Period	Annual rate of return (%)	Source
Aggergate	India	1953-71	40	Evenson and Jha (1973)
Aggregate	India	1960-73	63	Kahlon et al. (1977)
Aggregate	Japan	1880-1938	35	Tang (1963)
Aggregate	USA	1949-59	35 to 40	Griliches (1964)
Aggregate	USA	1959-69	26	Liu, Cline and Quance (1979)
Wheat	Columbia	1953-73	11-12	Hertford et al.
Rice	Asia	1950-65	32-39	Evenson and Flores (1978)
Cotton	Brazil	1924-67	77	Ayer (1970)

Source : Per Pinstrup-Andersen, 1982. Agricultural Research and Technology in Economic Development, Longmans, London.

Table 6. Agricultural research and extension expenditure as a percentage of the value of agricultural production, 1974

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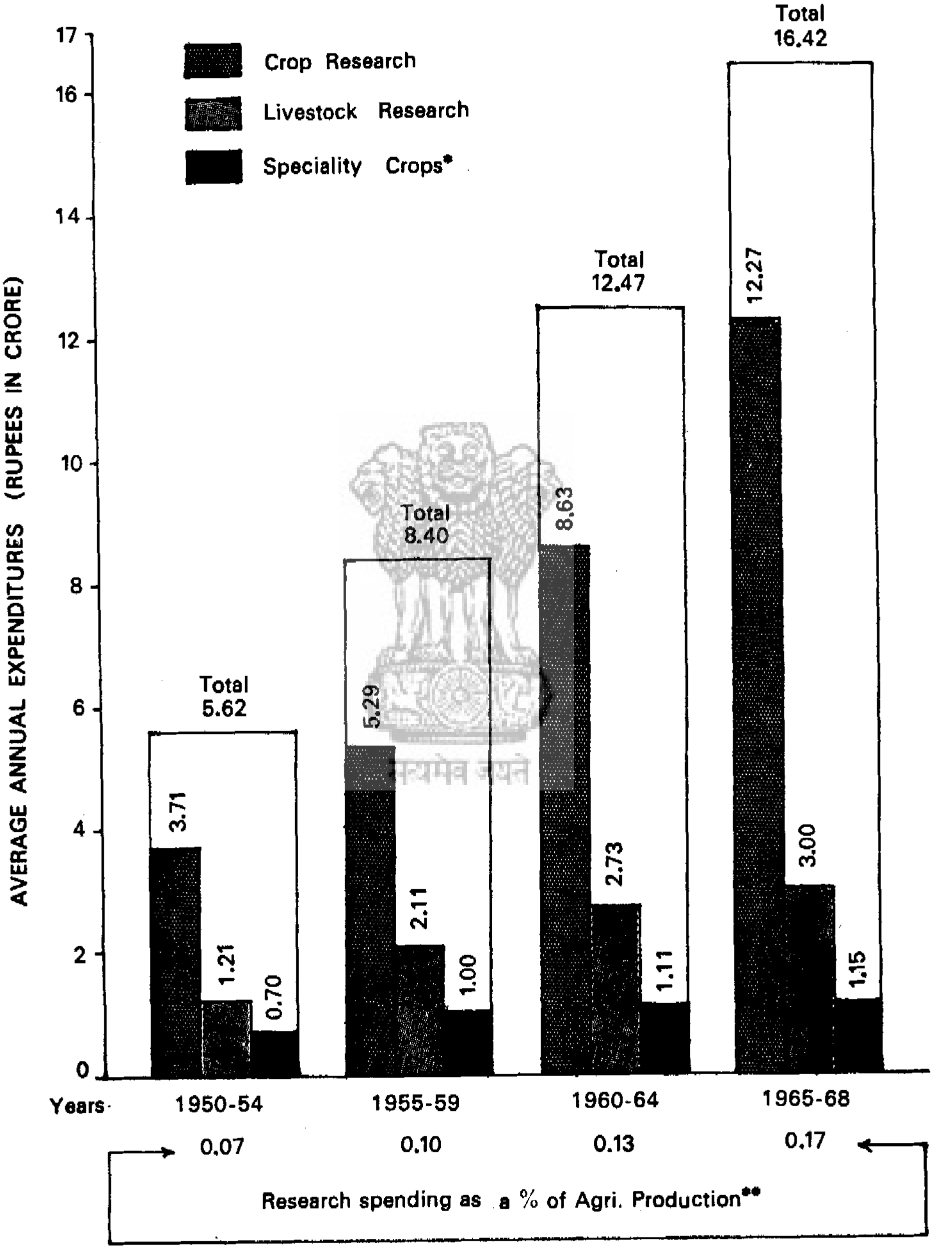
	Continent	Research	Extension
1.	Africa	1.40	2.20
2.	Asia	1.85	0.90
3.	Latin America	1.21	0.87
4.	North America and Oceania	2.70	0.61
5.	Western Europe	2.19	0.55
6.	Eastern Europe and USSR	1.83	0.50

Source : Boyce, K. and Evenson, R.E., 1975. National and International Agricultural Research and Extension Programs. Agricultural Development Council, New York.

Fig. 1

Estimates of Indian Agricultural Research Expenditures

(Crores of Rupees at constant 1968 prices)

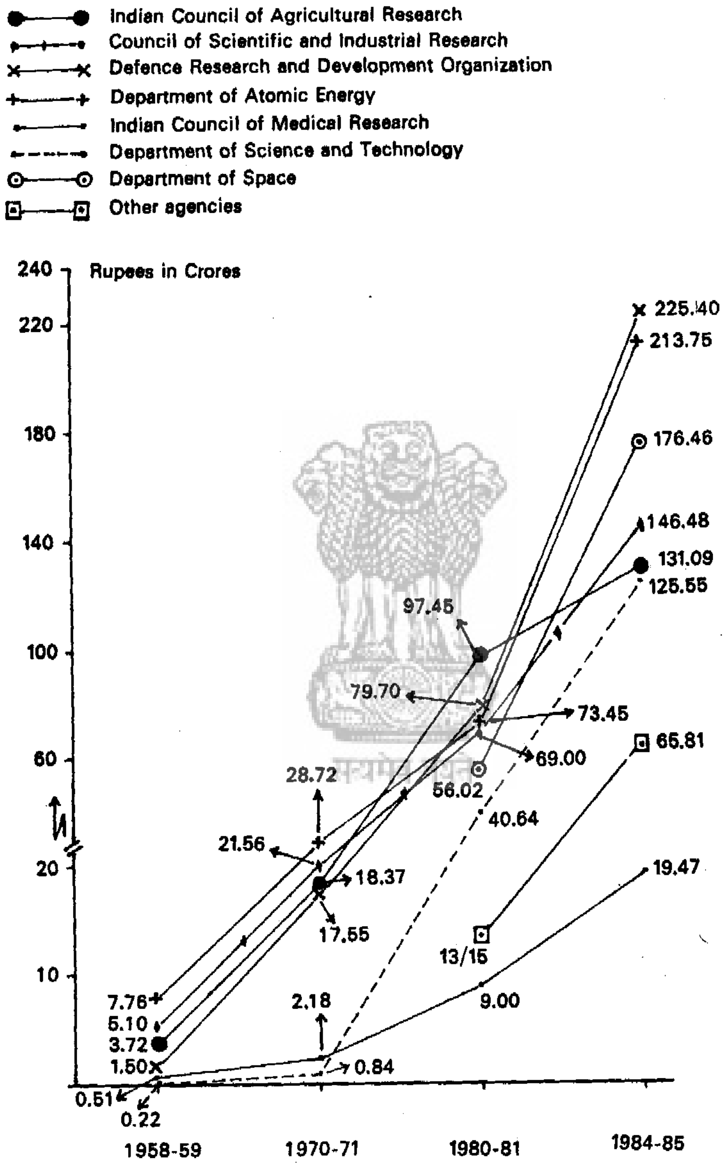


*INCLUDES COCONUTS, TEA ARECANUT, LAC AND JUTE.
OTHER CROPS INCLUDED IN CROP RESEARCH

**APPROXIMATED FROM INDIAN AGRICULTURE IN BRIEF

Fig. 2

Expenditure on major scientific organizations of the country in some selected years

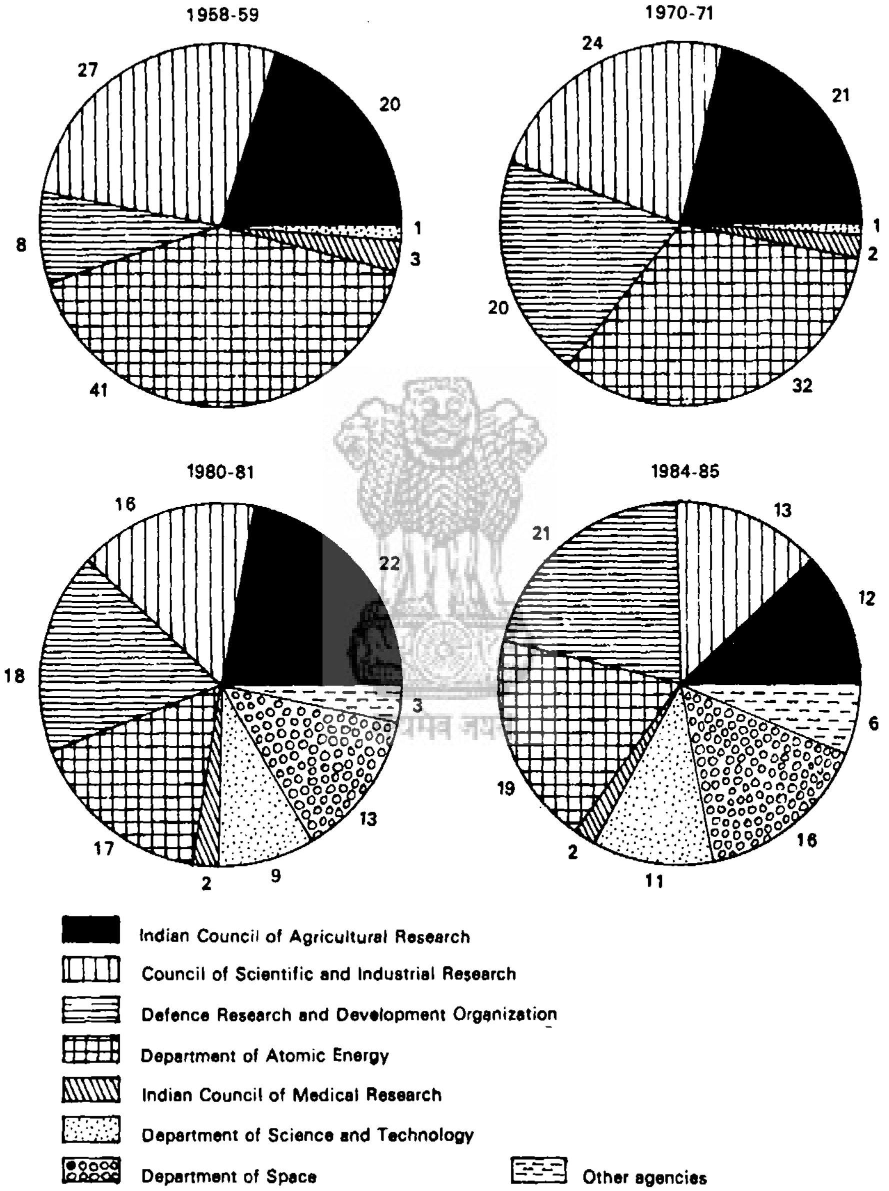


(Source : R and D Statistics, 1984-85, Department of Science and Technology, Government of India, New Delhi)

Fig.3

Expenditure on major scientific organizations of the country in some selected years

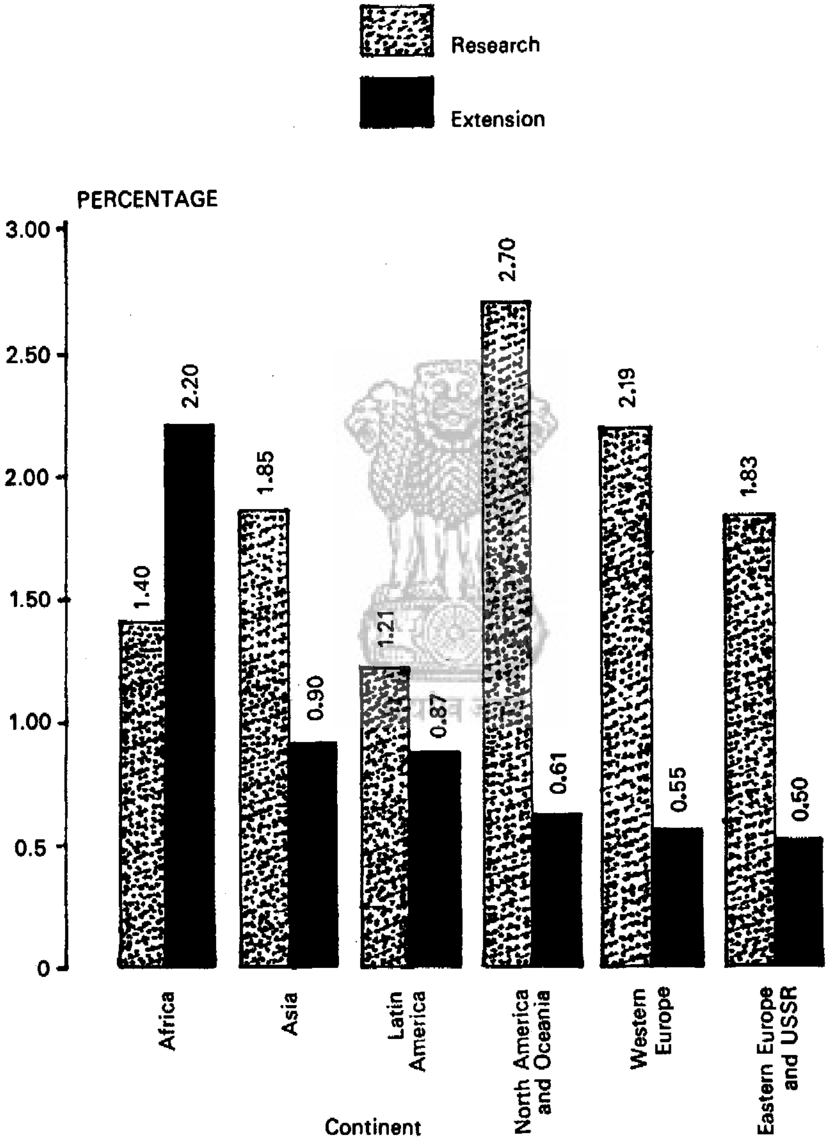
Percentage to total



(Source : R and D Statistics, 1984-85, Department of Science and Technology, Government of India, New Delhi)

Fig.4

Agricultural Research/Extension Expenditure as a percentage of the value of agricultural production, 1974



(Source : Boyce, K-and Evenson, R.E., 1975. National and International Agricultural Research and Extension programmes, Agricultural Development Council, New York)

CHAPTER 5

ORGANIZATIONAL STRUCTURE OF THE ICAR TO FULFIL ITS MANDATE

5.1 The National Agricultural Research System in the country comprises essentially two components— the ICAR at the National level and the State Agricultural Universities (SAUs) at the State level. Besides, several other agencies such as General Universities, Scientific Organizations like the CSIR, ICMR and BARC, various Departments/Ministries at the Centre, and private amd voluntary institutions also participate directly or indirectly in research activities related to agriculture. The developments in the agricultural sector which have taken the country towards self-sufficiency in food production have been possible due to the integrated efforts of the scientists working in the National Agricultural Research System, and both the ICAR and the SAUs can take credit for these remarkable achievements accomplished within a very short time.

5.2 Among the major scientific organizations in the country, the ICAR is unique in having concurrent responsibility for research, education and extension education. To fulfil its objectives, the ICAR, over the years, established a network of Research Institutes, National Bureaux, Project Directorates, Co-ordinated Research Projects, and National Research Centres distributed throughout the country. The ICAR has also sponsored and supported a large number of research projects located with the SAUs and State Governments to look at farming systems in an integrated manner by bringing together scientists working in well-defined areas into a working partnership.

5.3 There have also been changes in the scenario in the country as far as agricultural research and education are concerned in the last 27 years. All the States except those in the north-eastern region have established at least one Agricultural University to work on research problems of the region and to prepare trained manpower. Many of these Agricultural Universities have grown in strength and have developed the required research capabilities in terms of infrastructural facilities and scientific manpower, and have assumed the research responsibility at the State level. These have further been strengthened in their regional research competence through the establishment of 127 Regional Research Stations representing the different agro-ecological regions. Several International Research Centres working on specific crops, commodities and livestocks have been established, providing resources and material that transcend beyond the national borders. Under this altered set of circumstances, the role of the ICAR needs to be redefined, and a critical appraisal should be made of its mandate and organizational structure.

MANDATE OF THE ICAR

5.4 Agriculture is a State subject and the primary responsibility for agricultural research, education, extension education and development is with the States. However, as the apex organization in the country, co-ordinating agricultural research, education, and extension education, the ICAR should have a mandate to provide leadership in these areas and identify programmes and policies of national importance. In the light of these developments, the Committee feels that the mandate of the ICAR should be:

(1) To plan, undertake, aid, promote and co-ordinate agricultural, animal husbandry and fisheries education, research and its application;

(2) To act as a clearing-house of research and general information relating to agriculture, animal husbandry and fisheries matters through its Publications and Information system, and instituting and promoting transfer-of-technology programmes.

(3) To promote consultancy services in the fields of education, research, training and dissemination of information in agriculture, animal husbandry, fisheries and allied sciences.

(4) To look into the problems relating to broader areas of rural development, including post-harvest technology, by developing co-operative programmes with other organizations such as the Indian Council of Social Sciences Research, Council of Scientific and Industrial Research, Bhabha Atomic Research Centre, Universities, etc.

(5) To do other things considered necessary to attain the above objectives.

Research Responsibility

5.5 The network of the ICAR Institutes along with their regional research stations were earlier the primary centres of agricultural research, both at the national and regional levels. With the establishment of the SAUs and the strengthening of their regional research efforts through programmes like the NARP/AICRPs, etc., many of the SAUs have now developed research capabilities in terms of infrastructure and scientific manpower.

5.6 In the light of this, we recommend that the ICAR should primarily concentrate on planning, aiding, promoting and co-ordinating agricultural research in the country. Its direct involvement in research activities should be confined to basic and strategic research or other problems of national importance. The ICAR Institutes should become Centres of Excellence and develop their national character in the real spirit. The ICAR may continue to tackle regional problems only where they cannot be handled by the existing research infrastructure with the Agricultural Universities and State Agencies or where such infrastructure cannot be created now. This would include work in new and emerging areas of significance.

5.7 The manpower and facilities available in the ICAR Institutes in new and emerging areas of research would probably continue to be better than those available at most of the SAUs. The ICAR should provide assistance to the SAUs for developing scientific expertise and work in these new and emerging areas. We recommend this as one of the primary responsibilities and activities of the ICAR Institutes.

Responsibility for Agricultural Education

5.8 The ICAR has concurrent responsibilities for both agricultural research and education in the country. It has encouraged the establishment of the SAUs to strengthen education and research at the State level. However, of late, there is a proliferation in the number of Agricultural Universities. Even though it was envisaged at the time of starting the Agricultural Universities that the General Universities should give up the affiliated Agricultural Colleges, this has not happened in practice. Some of the newer SAUs and most of the Agricultural Colleges of the General Universities do not have a sound manpower base and have not been able to develop the required infrastructure and facilities. This has led to a perceptible fall in the standards of agricultural education. The quality of output, specially in research, will largely depend on the quality of the personnel coming out of the educational system and there is, thus, a need to upgrade our educational programmes and improve quality.

5.9 The manpower and infrastructure facilities available in the ICAR Institutes engaged in academic activities are of a fairly high standard. Efforts should be made to utilize these facilities effectively for training and education at the advanced level, specially in the frontier and emerging areas of research. The IARI and the IVRI enjoy deemed-to-be University status. We understand that efforts are under way to secure the same status to the NDRI and the CIFE. A number of other Institutes in collaboration with the SAUs or as affiliates of General Universities provide students of these Universities with research facilities. We recommend the ICAR should concentrate only on post-graduate programmes in its Institutes and leave all the under-graduate programmes to the Agricultural Universities. The Institutes which are not or will not become deemed-to-be-Universities could develop effective collaboration in post-graduate teaching and research with the SAUs in the region through participation in their educational and research programmes ensuring optimum utilization of the infrastructural facilities and trained manpower available in these Institutes. At the same time, the ICAR should evolve a suitable mechanism to maintain complementarity between the education programmes of its Institutes and the State Agricultural Universities.

Role in Extension Education

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5.10 The involvement of scientists in a research organization like the ICAR in extension education activities provides them opportunities to study the applicability of their research findings under field conditions and get direct feedback from the farmers, thus enabling them to make modifications in their technologies to suit the farmers' conditions. However, the ICAR Institutes are not adequately equipped in terms of manpower and other facilities to be fully involved in the extension programmes. Direct field level extension should not be the responsibility of the ICAR. The extension infrastructure of the Developmental Departments of the Centre and the States should be utilized for this purposes. The ICAR and the SAUs should be involved only on a limited scale mainly in first-line extension activities, and in education and training the extension personnel of the State Agencies and farmers. The working relationship between these agencies and the ICAR should be improved by promoting constant interaction by sharing of research findings at one end and extension experiences at the other.

INFORMATION SYSTEMS

Information Network (ICARNET)

5.11 To aid the decision-making process at the various levels in Governmental agencies, information systems and data bases are necessary. At present, these are very poorly organized at the national level. A number of organizations within our country and outside have developed mechanical and computerized techniques of information storage, retrieval and use. We suggest that the ICAR should take full advantage of these and should actively participate in the National and International Information Networks. The ICAR should also widen the scope of its information services and take steps to improve the quality of its publications. Mere methodologies of data storage and retrieval, however, are not enough. The data to be collected, their usefulness and use will have to receive more attention, and this should be a prerequisite in developing and using the modern Information Networks. We also recommend that the ICAR should develop its computerized satellite-based Information Network (ICARNET) which should be available to scientists in the Institutes and the SAUs on on-line terminals. This network could be engaged to (a) institute on-line agricultural research information network, (b) develop research project monitoring system, (c) organize scientist profiles in the data bank, (d) build equipment data, (e) develop systems to monitor personnel and equipment usage, and (f) feed the information and data to the headquarters as also to the Institutes, the SAUs and other agencies. The existing Publications and Information Division and the Agricultural Research Information Centre (ARIC), which are at present a part of the ICAR Headquarters, should be merged and converted into a separate Directorate of Publications and Information and be suitably strengthened to fulfil its role as a premier institution of its kind in the country. After the reorganisation of Publications and Information Division, the Public Relations Unit, now currently a part of this Division should become a part of the ICAR Headquarters and may be suitably strengthened.

Provision of Library Services including Documentation, Information Storage and Retrieval

5.12 The entire scientific community is currently passing through an era of information explosion. In order for the ICAR scientists to upgrade their knowledge by keeping track of the developments elsewhere and to plan and organize their research activities in a more efficient way, it is essential to provide them with the required information in time and in a readily usable form. Toward meeting these requirements, it is necessary to document the available information in a more scientific way, store in proper form using modern gadgets, and retrieve the stored information quickly whenever required. This will greatly enhance the efficiency of the working scientists in managing their research programmes. In addition, a properly organized management information system will serve as an effective management tool for the research managers and administrators for making timely decisions.

5.13 Unfortunately, the present documentation, information storage and retrieval services in the ICAR system are not satisfactory. In most of the ICAR Institutes, the libraries are considered only as storehouses of books and periodicals. In many cases, they are understaffed and are often looked after by scientists and administrative staff who are not qualified for this specialized type of work. There is complete lack of scientifically organized information storage and retrieval system in the ICAR Institutes. As a result, the working scientists as well as research managers suffer for want of proper information in a timely way, though the Institutes spend lot of resources in procuring books and periodicals.

5.14 We therefore strongly recommend that the ICAR should take necessary steps to provide adequate documentation, information storage and retrieval services in all its Institutes including the Council's Headquarters so that its scientists are able to keep pace with the scientific developments in the rest of the world. Modern-day gadgets like computers should invariably be used by the ICAR. It should also make efforts to provide sufficiently qualified manpower in required numbers to operate these services more effectively. These services in the individual Institutes should form a part of the national network for establishing inter-institutional scientific linkages, which in turn should be linked to the international information networks like the AGRIS, CARIS, etc., for international coverage.

Thrust on Economic Analysis

5.15 Research costs in agriculture, as in other areas, are increasing due to the rise in prices of books, journals, equipment, chemicals and other inputs. Increase in emoluments due to higher cost of living is an ever-increasing burden. It may be increasingly difficult for the Government to increase the funding for R & D at the rate required. It is, therefore, imperative that R & D funds are used judiciously to maximize the output of R & D investments. Towards this end, the long-term agricultural research planning geared to meet the requirements of the 21st century needs detailed economic analysis. Research in the area of agricultural economics is currently at a low ebb and needs special emphasis in project planning and evaluation. Costs in the production of agricultural commodities will have to be at economic rates competitive in the world market. Therefore we feel that it is necessary for the ICAR to give more attention to the economic analysis of the programmes and projects undertaken by it. We recommend that the ICAR should take steps to create and strengthen the required infrastructure, including manpower, for this purpose.

Autonomy of the ICAR

5.16 The operational efficiency of any research organization is greatly enhanced by autonomous functioning with the minimum of bureaucratic interference. The reorganization which the ICAR underwent in 1973 was, in fact, a major step taken to bestow such autonomy in its technical and administrative functioning. Though the ICAR was retained as a Scientific Society with the purpose of making it an autonomous body, today it does not exercise its autonomy because of the self-imposed existing practices of financial and procedural controls. Flexibility of operation, specially on financial matters, have become severely restricted as the ICAR follows the Government of India rules mutatis mutandis and has, more often than not, sacrificed its autonomy in favour of Government rules and regulations. It is interesting to note that the CSIR rules and regulations and byelaws also specify mutatis mutandis constraint, but its functioning is practically fully autonomous. We also found that several scientific organizations in the country like the CSIR Institutes, BARC, Space Research Institute, Raman Research Institute, etc., functioned with a greater degree of autonomy, meeting the needs of scientific establishments.

5.17 Unlike the Bhabha Atomic Research Centre, which was built up from a core group of scientists and administrators from the Tata Institute of Fundamental Research with its institutional and cultural practices, the ICAR was built up from the personnel from the Ministry of Food and Agriculture and is thus saddled with administrative practices prevalent in Government Departments. The cultural ethos of the ICAR is somewhat different from what is suited to an R & D organization. The operating mechanism of the ICAR includes factors such as control procedures, information system, reward-and-appraisal system, standardized rules and procedures and spatial arrangements.

5.18 In March 1965, it was decided with the approval of the Cabinet to declare the Indian Agricultural Research Institute (IARI), the Indian Veterinary Research Institute (IVRI), and the National Dairy Research Institute (NDRI) as National Institutes with the contemplation that they would be conferred a degree of autonomy similar to that enjoyed by the Tata Institute of Fundamental Research. However, before further action could be taken to implement this decision, another proposal happened to be under consideration to declare the ICAR as a whole as an Institution of National Importance and to convert it into a Statutory Body. It was felt that once the ICAR was converted into a Statutory Body, it may not be necessary to process the proposal for converting the three Institutes as Statutory Organizations separately. The proposal to undertake legislation for converting the ICAR as a whole into a Statutory Body was approved by the Cabinet on 30 June 1970. The matter was, however, subsequently reviewed. It was felt that while the Society format affords flexibility in structure, a Statutory Body will have a rigid organization, and for making even slight changes, it would be necessary to introduce amendments to the Act, and thus a Statutory Body would be no better than the existing Society format. It was, therefore, decided with the approval of the Cabinet in the wake of 1973 reorganization of the ICAR to continue it as a Society, but with greater amount of autonomy and flexibility in its operation.

5.19 This Committee has very carefully considered the question of converting the ICAR into a Statutory Corporate Body through an Act of Parliament. It is of the view that as a research organization, engaged in vital agricultural sector, the ICAR should exercise its autonomy in all its operations, both technical as well as administrative. Therefore, the Committee is of the opinion that converting the ICAR into a Statutory Body will not only lead to inordinate delay in the initial stage for bringing about the change but will also restrain the ICAR in modifying its procedures in future. Therefore, the ICAR should continue to be a Society for ensuring greater effectiveness, but should be empowered to amend its Rules and Byelaws, without reference to the Government, to meet its functional requirments developing from time to time. At the same time, a quick and concerted approach should be made to streamline the existing operational procedures for restoring real autonomy to the ICAR and immediate steps be taken by the ICAR to develop its Rules and Regulations in a manner that will ensure its complete financial and administratrive autonomy. In this connection, the Committee would like to cite the example of the CSIR, which in its functioning operates with greater degree of autonomy. The Committee also wishes to emphasize that this autonomy should be linked to accountability.

5.20 A point was made before this Committee in very strong terms to suggest that the IARI, and the IVRI, which are at present deemed-to-be Universities, and also the NDRI, which is likely to be granted a similar status, be declared statutory bodies through an Act of Parilament so as to make them independent in their functioning, like the All India Institute of Medical Sciences, the Indian Institute of Technology and the Tata Institute of Fundamental Research. The Committee has given its very careful consideration to this proposal, but feels that taking away the three Institutes from the mainstream of agricultural research will not be in the larger interest of the country, as there would be problems of co-ordination and interaction between them and other research instutions of the Council, particularly now when various Institutes, both at the Centre and the States, and the SAUs are involved in conducting research on similar subjects. The Committee, therefore, feels that as recommended in the preceding para, the ICAR as a whole, including the above three Institutes, should continue with their present Society status, except that the three National Institutes could be granted maximum autonomy and flexibility in their operational sphere to enable them to play a national role in concentrating on basic and strategic research and human resources development.

Functioning of Various Bodies of the ICAR

5.21 In its functioning, the ICAR is assisted by a number of bodies, which provide direction and guidance on policy, technical, administrative, financial and other matters concerned with the national agricultural research and education efforts. Since the efficiency with which these bodies function will have a direct bearing on the overall effectiveness of the ICAR, there is need to examine their composition, role and responsibilities.

The ICAR Society

5.22 The ICAR Society is the supreme body that meets at least once in a year and reviews the progress and performance of the constitutent units of the Society and gives such policy directions as it may deem fit to the Governing Body and other constituent units of the Society. The membership of the Society is at present large and unwieldy, making it difficult to function as an effective organization that can provide proper direction to the policies and programmes of the ICAR. Most of the members do not even attend these meetings and do not make contributions of a substantial nature. In order to make this a more effective policy-making forum, we suggest that its membership may predominantly comprise policy planners, administrators, scientists and representatives of scientific organizations. It may also be necessary in this forum to give adequate and due representation to States and farmers' organizations as user-agencies.

5.23 We recommend that the ICAR Society should be reconstituted on the following lines.

		Existing	*Proposed*
a)	Minister for Agriculture, President of ICAR Society	1	1
b)	Minister of State for Agriculture, Vice-President	1	1
c)	Union Ministers		
	Finance	1	-
	Planning	1	-
	Science and Technology	1	1
	Education	1	1
	Commerce	1	-
d)	Other Ministers in the Union Ministry of Agriculture	2	2
e)	Ministers from States		
	Agriculture	25	20 from different States to be nominated by the President, ICAR.
	Animal Husbandry	25	
	Fisheries	25	
f)	Member, Planning Commission (Agriculture)	1	1
g)	Members of Parliament		
	Lok Sabha	4	4
	Rajya Sabha	2	2
h)	Director-General, ICAR	1	1
i)	Secretary in the Ministry of Agriculture	1	1
j)	Secretary, Planning Commission	1	-
k)	Chairman, UGC	1	1
l)	Chairman, Atomic Energy Commission (or BARC)	1	-
m)	Member (Finance)	1	1
n)	Vice-Chancellors of Agricultural Universities	4	4
o)	Technical Representatives		

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	like Agriculture, Animal Husbandry and Fisheries Commissioners and Inspector-General of Forests	4	4
p)	Scientists from other scientific organizations including one from the ICMR	15	5
q)	Representatives of Commerce and Industry	3	3
r)	Farmers (one from each region)	8	8
s)	Representatives of rural interests	4	-
t)	Directors of ICAR Institutes	4	4
u)	Secretary, ICAR, as Secretary	1	(to function only as Secretary)

5.24 The Society may constitute Subcommittees which may report, at the annual meeting, progress on specific sectors of activity; this will be very useful to policy formulation at the national level.

Governing Body

5.25 The Governing Body—the chief executive and decision-making body of the Council — is responsible for the governance of the ICAR as a whole and thus has a very crucial role to play. The present constitution of the Governing Body is too wide and unwieldy with too many non-technical persons as Members. It was also noticed that the agenda items for the Governing Body include trivial matters that could be disposed of at other levels. The Governing Body should function as an effective decision-making and policy-implementaion body that can discuss in depth matters requiring attenton at the national level. As in the CSIR, the Governing Body of the ICAR should truly be professional in nature and should primarily have a membership of the scientists related to agriculture and allied areas. Instead of acting in routine way, it should pay sufficient attention to review major sectors of research, education and extension education activities of the ICAR more critically, of course with the assistance of the other bodies in the ICAR, and concern itself in the allocation of major resources in terms of men and materials on the basis of needs and priorities.

5.26 We, therefore, recommend the following composition for the Governing Body:

i)	Director-General, ICAR	Chairman
ii)	3 Vice-Chancellors of the SAUs	Members
iii)	3 Directors of the ICAR Institutes	Members
iv)	4 outstanding scientists/eminent persons in agriculture and allied areas	Members
v)	Secretary (Expenditure), Ministry of Finance, Government of India.	Member (Finance)
vi)	Secretary, ICAR	Secretary

FINANCIAL MANAGEMENT

5.27 According to the Byelaws of the ICAR, the Governing Body is vested with full powers to sanction expenditure on any service up to any amount included in the sanctioned budget. The Governing Body of the Society is also entrusted with the responsibility of managing, administering, directing and controlling the affairs and funds of the ICAR. The decisions taken by the Governing Body are to be implemented after the proceedings of the meeting are approved by the President, ICAR. One of the Secretaries or Additional Secretaries in the Ministry of Finance is the Member (Finance) on the Governing Body. The rules of the ICAR provide that in the event of disagreement between the Member (Finance) and the Chairman of the Governing Body (Director-General, ICAR) on any financial matter beyond the delegated powers of the Director-General as Secretary to the Government of India, the matter is to be referred to the Ministers of Agriculture and Finance for a final decision. The main contention of the ICAR is that it is unable to enjoy proper financial autonomy because the Member (Finance) exercises a veto power in relation to any proposals of the ICAR which, in the opinion of the Member (Finance), are not deserving clearance. The rule position in this regard has been examined with reference to what is prevailing in other similar organizations like the CSIR, ICMR, etc. It transpires that various relevant provisions in this respect in the rules of the ICAR, CSIR, etc., are almost the same and there is no difference in relation to the powers and functions of the Member (Finance). There are, however, certain variations in the working procedures of the CSIR and ICAR. In the CSIR, generally, the approval of the Member (Finance) is sought by means of agenda notes for SFC/GB where the Member (Finance) takes full opportunity to express his views only after hearing other Members of the Governing Body about the merits of each proposal. Secondly, in the CSIR, the Member (Finance) is involved in the affairs of the Council without any intermediary like the Financial Adviser of the Ministry/

Department concerned. In the ICAR because of some historical backgroud, the functioning of the Council vis-a-vis the Member (Finance) has been through the Financial Adviser in the Department of Agriculture/DARE. All financial proposals of the ICAR beyond the purview of the Director-General, are referred to the Financial Adivser of the Ministry who at his discretion would clear or reject a proposal or may forward it to Member (Finance). Thirdly, in the CSIR, the Internal Finance Adviser is a whole-time employee of the Council fully answerable to the Director-General. He is an officer of the rank of Joint Secretary. In the ICAR, there is the Director (Finance) who, is an officer below the status of Joint Secretary and in his capacity as the Internal Financial Adviser, ICAR, he deals with the Member (Finance) through the Financial Adviser, DARE. The FA(DARE) also deals with the Member (Finance) directly and not through the Director-General, ICAR. In this way, unlike in the CSIR, the Financial Adviser (DARE)—a Government Officer — has become fully involved in the financial affairs of the ICAR.

5.28 The financial structure chosen for an Institution should be such as to permit flexibility in operaton and full autonomy consistent with the required degree of accountabiity to ensure a good return on the investments made on the Institution. It is, therefore, necessary for the ICAR to develop its own Service and Financial Rules and also to simplify its working procedures on the lines of the CSIR, DAE, etc.

5.29 In the above background, we recommend that following operational changes be made in the financial management systems of the ICAR:

(a) The post of Director (F) of the ICAR should be upgraded to the pay-scale of Joint Secretary and designated as Internal Financial Adviser (IFA).

(b) The IFA should be a whole-time employee of the ICAR and should be responsible for control of Finance/Budget of the ICAR, maintenance of accounts and internal audit.

(c) The practice of single-file system in dealing with Finance and others outside the ICAR should be discontinued (except in exceptional situations with the prior knowledge and approval of the Director-General, ICAR).

(d) Only Secretary (Expenditure) in the Ministry of Finance should be associated as Member (Finance) on the Governing Body of ICAR as in the case of the Governing Body of CSIR. The concurrence of the Member (Finance) should generally be sought only by means of self-contained agenda notes to be considered and decided in the course of formal meetings of the Standing Finance Committee/Governing Body, for which adequate notice should be given to the Member (Finance).

(e) Consequent to the upgradation of the status of Director (F), FA(DARE) should have no role to play in the internal affairs of the ICAR. The role of FA(DARE) should be limited exclusively to financial matters relating to the DARE and the Budgetary affairs of the ICAR at the appropriate stage.

(f) The Finance Wing of the ICAR Headquarters should be reorganized separating the audit from accounts under the charge of two separate Directors, and greater emphasis be laid on internal audit of the ICAR Institutes to ensure uniformity in financial procedures and proper accoutability at all levels. The working of the Finance Wing of the ICAR should be reviewed, particularly relating to the existing procedures of releases of grant.

PROCESSING OF PLAN SCHEMES

5.30 As in the case of the CSIR, the PIC/EFC procedure should not apply to the ICAR while sanctioning Plan schemes. Once the Plan outlay and the budget of the ICAR have been approved, the DARE or its PIC/EFC should not involve itself in the sanctioning of Plan schemes. The individual Plan schemes should be scrutinized by the Divisional Committee of the ICAR on which the representatives of the Planning Commission and others considered appropriate as Apprising Agencies should be associated. Thereafter the Director-General, ICAR/Governing Body should be competent to sanction the Plan schemes.

5.31 The sanction of additional posts, purchase of vehicles and works programmes, wherever these are a part of the Plan schemes, should also be looked into by the ICAR itself and finalized with the approval of the Governing Body without any reference to Finance, for which a working procedure may be evolved by the ICAR in consultation with Member (Finance) on the lines of the CSIR to take an overall view of the existing vacancies in the entire system for their deployment in areas/Institutes where additional posts are required for new schemes or before releasing the vacancies in the ongoing schemes for being filled in relaxation of current ban orders. Once this procedure is settled, it should not be necessary for the ICAR to go to Finance in each case of sanction of additional posts or for releasing the vacant posts for being filled in relaxation of the ban orders. This should be totally within the powers of the Director-General, ICAR. The Governing Body, in addition, should act as a 'think tank' providing leadership and guidance in all matters relating to agricultural research and education.

Norms and Accreditation Committee

5.32 As the number of Colleges and Universities in agriculture and allied areas increases, it becomes necessary to ensure proper maintenance of the standards of agricultural education. Except for its advisory role in agricultural education, the Norms and Accreditation Committee of the ICAR at present has very little role in determining and enforcing the quality of agricultural education in the country as the ICAR is not a Statutory Body like the UGC.

5.33 The UGC and the ICAR should develop a proper Memorandum of Understanding to allow the ICAR to discharge its role in agricultural education. The Norms and Accreditation Committee should be reconstituted and provided with suitable authority to look into the role of the ICAR in determining and maintaining the standards of agricultural education. It may also constitute a small task-force with the UGC to look into the problems of poor standards of agricultural education in Agricultural Colleges affiliated to General Universities and advise them on improving their standards of agricultural education. We recommend that steps may also be taken to ensure that no new academic Institutions or teaching programmes in agriculture and allied areas are initiated without the explicit approval of the ICAR, which in turn may do it on the recommendations of the Norms and Accreditation Committee.

Regional Committees

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5.34 The Governing Body of the ICAR has constituted eight Regional Committees on the basis of agro-climatic zones and other relevant factors. The Director-General, ICAR, is the Chairman of these Committees. Other members of the Regional Committee comprise (1) Members of the ICAR Society residing in the region, (2) Chairman of the Development Councils constituted by the Department of Agriculture of the Government of India located in the region, (3) Directors of the ICAR Institutes in the region, (4) Scientists/technical representatives of the SAUs, State Development Departments related to Agriculture, Animal Husbandry, Fisheries, etc., Central Institutes, and Department of Agriculture of the Union Ministry of Agriculture, and (5) farmers nominated by the President of the Society. One of the Directors of the ICAR Institutes in the region acts as the Member-Secretary. There is an Assistant Director-General (CSC) at the ICAR Headquarters to co-ordinate the work of the Regional Committees. The proceedings and recommendations of the Regional Committees are put up to the Governing Body for information. The primary functions of the Regional Committees are (i) to review the status of Agricultural Research and Education in the region and (ii) to analyse, discuss and make recommendations on the location-specific problems of Agriculture, Animal Husbandry, Fisheries and Forestry peculiar to the region. The Regional Committees meet once every year.

5.35 The committee feels that with the participation of Ministers of Agriculture, Animal Husbandry, Fisheries, etc., as at present, a lot of time is spent on formal inauguration; there is also little participation from the Development Departments from the States in the region and the Centre. The interaction is confined primarily to the ICAR and the SAUs in the region. The Committee is of the view that considering the importance of the Regional Committees, there is a need for improving their functioning. This will require changes in their composition and methods of functioning. The Regional Committees may comprise a Chairman, a small number of senior technical personnel representing Central and State Development Departments related to Agriculture, Animal Husbandry, Fisheries, etc., a few representatives of the SAUs, ICAR Institutes in the region and the ICAR Headquarters. The agenda of the Committee should be brief and related to discussions on location-specific problems of Agricultural Research and Education and the proposed solutions. The Committee should meet at least twice a year prior to the rabi and kharif seasons. The Director-General who is the Chairman of the Regional Committees, may nominate a Deputy Director General to chair, if necessary. One of the Directors of the Institutes in the region, by rotation, should function as Member-Secretary of the Committee. He should be assisted by a Scientist, to be designated as Joint Director, who should be provided by the ICAR Headquarters from within the existing scientific strength, without resorting to the creation of additional posts. He should be provided with a small nucleus of administrative and technical support. This unit should deal exclusively with the work of the Committee and, in addition to organizing the meetings, will follow up action on each of the recommendations with the SAUs, ICAR Institutes and the State Development Departments. The proceedings of the Committee should be brief and should only indicate the action points. The Joint Director will also act as a Liaison Officer between the Council's Headquarters, ICAR Institutes, the SAUs and the State Development Department in the region.

SCIENTIFIC PANELS

5.36 The Scientific Panels in different disciplines advise the ICAR on technical matters related to agricultural research, education and extension education. At present these Panels only scrutinize the technical soundness and feasibility of project proposals submitted for funding out of the AP Cess Fund. Now that we are instituting the media of Research Advisory Committees at the Institute level and a Standing Policy Planning Committee at the Headquarter's level, the Scientific Panels should assume the responsibility of assisting the above Committees of the ICAR with their recommendations on areas within their purview. The involvement of Scientific Panels in the appraisal and evaluation of all the Scientific Research Programmes of the ICAR will bring in an overall improvement in the research functions of the ICAR. With the introduction of this process, the Director-General, ICAR, could sanction the research schemes and implement other recommendations of the Policy Planning Committee with a degree of better satisfaction about the merits of each proposal.

ORGANIZATIONAL STRUCTURE OF THE ICAR

Headquarters Functioning

5.37 The Director-General, who is the Chief Executive of the ICAR, manages all the affairs of the ICAR with the assistance of the Technical Divisions and the Administrative Wing at the Headquarters. On the technical side, the Director-General is assisted by the DDGs,ADGs and senior scientists; on the administrative side, he is assisted by the Secretary, ICAR, and other secretarial staff. The Institutes are reviewed, guided and serviced by the Headquarters on all matters. During our discussions with a number of scientists and others, we noticed a general feeling that the present dichotomous structure at the Headquarters has resulted in delays and sometimes even inconsistency in directions, thus affecting adversely the smooth working of the Institutes. We have carefully looked into this aspect and feel that such a structure does not exist in any of the similarily placed research organizations. Further, any technical proposal does involve an element of administrative and financial consideration and cannot be dealt with in isolation. Such a clear distinction between the administrative and technical wings is bound to give rise to two distinct lines of command at the ICAR Headquarters, as far as the functioning of the Institutes is concerned. We, therefore, recommend that this dichotomous structure should be dispensed with. We also recommend that there should be a complete integration of the technical and administrative wings at the Headquarters.

5.38 It has also been noticed that the Headquarters is currently dealing with trivial matters concerning administration and accounts, many of which are of a routine nature. The Institutes should be provided with sufficient autonomy of functioning so that only very few cases need be handled at the Headquarters level.

5.39 We also recommend that the ICAR should adopt modernization in its office procedures and equipments that will cut down delays and improve efficiency. For this, the ICAR should immediately introduce officer-oriented system of working at all levels with adequate provision for level-jumping, as also Desk-Offricer system in place of the existing conventional Sections.

Headquarters Posts

5.40 The Director-General should, irrespective of his seniority or age, enjoy the highest respect of his peers in the agricultural scientific community and be a person recognized internationally for significant contributions to thought and management. He should be able to provide leadership of high quality and will have a dominant role to play in fostering in the development of agricultural research and education in the country.

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5.41 As for other research-management positions in the Institutes, the senior-level scientists at the Headquarters should also be appointed through open competition on tenurial basis, with a tenure of five years and with a provision of another tenure of five years. There should be a continuous rotation between the ICAR Institutes, the SAUs and the ICAR Headquarters so that a healthy understanding of each other's role in the overall achievement of the objectives of the system can be accomplished.

5.42 The ICAR Headquarters should act as a 'think-tank'. The Deputy Directors General should be leaders in their area of responsibility to conceptualize the research needs, identify priorities, and allocate resources. They should be responsible for planning, evaluation, monitoring and co-ordination of research programmes in the ICAR Institutes, under the AICRPs, AP Cess Fund, programmes supported from the US-India funds, and bilateral co-operative and foreign aided projects. Considering the size of the organization and diversity of activities, it will not be possible for the

Director-General to handle all the affairs of the ICAR without proper assistance. The senior-level specialists will have to do critical study of the research, educational and extension educational programmes in their areas of responsibility. The DG and the DDGs should constitute a Board to discuss all important technical and organizational matters and take decisions for which regular meetings should be held. The DDGs may be vested with proper authority to discharge their responsibilities.

5.43 The Secretary, ICAR should be a whole-time employee borne on the strength of the ICAR and this position be filled on a tenurial basis.

5.44 The functions of the Secretary, ICAR, may be revised to enable him to devote more attention to the organizational matters and extending advice to other scientific and administrative functionaries. The primary responsibility of the Secretary, ICAR, should be:

(a) To act as an Adviser on all administrative matters to the DG and to extend his advice to the DDGs/Directors where sought for.

(b) To act as Secretary to the Society, the Standing Finance Committee and the Governing Body and to organize their meetings and process the implementation of their recommendations.

(c) To oversee administrative, vigilance and organizational disciplines as also to deal with representations and appeals falling within his own powers and the powers of the DG.

(d) To deal with establishment matters in respect of the headquarters' staff.

(e) To finalize budget estimates and supplementary estimates of the ICAR as also to deal with Audit Reports and Appropriation Accounts.

(f) To enter into agreements on behalf of the ICAR, and to represent or cause to be represented on behalf of the ICAR in disputes before the Courts/tribunals/arbitrators.

5.45 With the delegation of greater powers and responsibility to the Institute Directors, Management Boards and Committees, and the structural and functional changes proposed for the Headquarters the strength of personnel at the Headquarters, both of technical and administrative categories, would need critical review. This should be got carried out by the ICAR through a professional management Institute like the IIM, Ahmedabad. Meanwhile, the strength of DDGs and ADGs at the Headquarters may be frozen at the present level, and, if possible, the ICAR should try to reduce the number of posts at these levels through deployment elsewhere. The

Committee also feels that at Headquarters there should be no posts of Scientists below the level of ADG.

HEADQUARTERS STRUCTURE

5.46 The present structure of the Headquarters, divided into subject-matter divisions dealing with crop sciences, animal sciences, fisheries, horticulture, soils and agronomy, and agricultural engineering, transfer of technology and agricultural education needs a review as agricultural research is more than an application of a wide variety of sciences.A revised organizational structure is suggested. It basically consists of three groups dealing with (a) Crop Sciences, comprising crops, soils, agronomy, engineering and horticulture, (b) Animal Sciences, comprising animal sciences and fisheries; (c) Human Resources Development, including social sciences, education and training. Transfer of technology should form a part of all the three groups. The Crop and Animal Sciences Groups would be assisted by two Teams, namely, (i) Research Planning Team; and (ii) Technology Assessment and Development Team.

5.47 The Groups and Teams have to be multi-disciplinary, collegial and fluid so that based on the necessities of work and expertise, individual members of the Team could work in different Teams. The members would be chosen for their expertise in the specific fields and would have equal voice in decision-making. Each Team would have a co-ordinator if possible by rotation who would be responsible for the work agenda, meetings and for channelling the decisions of the Team to the concerned agencies. The functions of each Team are indicated below. Besides, these main Teams, some modest organization on similar pattern may be needed to deal with general management and administration, the University System, etc.

Technology Assessment and Development Team

5.48 This Team will:

(a) Keep abreast of technology developments in agriculture and allied fields to see how best these could be used for furthering the objectives of the ICAR.

(b) Decide whether these technologies could be developed in the ICAR Network, fostered in outside agencies, or only taken advantage of for furthering its objectives (e.g. tissue culture, monoclonal antibodies, remote-sensing).

(c) Assess the impact of technology on crops, environment, human life, and society; its mode of development and diffusion through Institutes, Universities, Governmental agencies, co-operatives, voluntary agencies and private business, its demands on manpower skills, knowledge, raw materials, finance and space, its impact on production, productivity, soils, water and competing crops.

(d) Study legal patent, licensing procedures and formalities.

(e) Build organizational and institutional aspect of decision-making.

(f) Consider areas of basic research which should be promoted by the ICAR either within its Institutes or outside to be in the vanguard to take advantages emanating from such research as also to avoid the possibilities of being barred from it because of legal and patent formalities.

Research Planning Team

5.49 This Team will:

I. (a) Arrive at concrete and monitorable objectives in line with the socio-economic, technological and ecological environment keeping in view the organizational strength and weaknesses as well as the expectations of the recipients.

(b) Communicate the objectives to all the Institutes, Universities, other agencies, scientists and the general public.

(c) Evaluate alternative courses of action to achieve the objectives.

(d) Plan strategies to achieve the objectives.

(e) Develop technical plans for each of the strategies.

(f) Integrate technical plans.

II (a) Develop research project evaluation and rating guidelines in consultation with Institutes and Universities.

(b) Communicate the evaluation guidelines to Institutes, Universities and scientists.

(c) Get proposals from Institutes, Universities and other agencies.

(d) Prescribe and grade the proposals on the basis of the guidelines developed in II(a).

(e) Convey the go-ahead signal to the concerned agencies (within the availability of the resources, manpower and equipment).

III. (a) Monitor the progress of the projects on the on-line terminals every quarter.

(b) Help Institutes, Universities and agencies to decide on key areas of performance for completing the projects on schedule within the budget.

(c) Where projects go astray from the proposals, examine the justification.

(d) See if help can be given to projects falling behind schedule.

(e) Examine whether projects should be redefined in altered circumstances or should be closed.

Human Resources Development Team (Social Sciences, including Agricultural Economics and Statistics)

5.50 This Team will:

(a) Recruit, select and allocate personnel and create a pool of scientists from which the Institutes should draw their personnel.

(b) Institute on-line performance-review system coupled with increments/promotion or training programmes.

(c) Impart training so that the fresh entrant is familiar with objectives and is oriented to research culture, training to upgrade knowledge and skills of personnel, training to overcome specific weaknesses of personnel brought out in their performance assessment; training to enable growth and development of personnel; training for new technologies development.

(d) Develop scientists Data Bank.

(e) Arrange periodically attitude-surveys to assess the morale of the scientists.

(f) Look into social sciences research with specific reference to Agricultural Economics and Statistics. The creation and functioning of the Human Resources Development Team should be decided by the Council keeping in view of this Committee's observations on the role of ASRB as contained in Chapter 7.

DECENTRALIZATION OF DECISION-MAKING PROCESS

5.51 The ICAR has grown into a big scientific organization over the years. It has also multiplied its activities, and many changes have been brought about in its operations for ensuring greater effectiveness of the system during this period. The growth in the size of the organization calls for decentralization of responsibilities and delegation of powers at various levels in order to make the organization more productive and effective functionally. At present, at the Headquarters levels, major decisions are made at the Director Generals' level. Certain decisions are made at the

DDG's level on technical matters and at the Secretary's level on administrative matters. The ADGs are mainly responsible for the Co-ordinated Research Projects, AP Cess funded projects as well as the projects run with external assistance.

5.52 More decentralization of power at the ICAR Headquarters for making timely decisions will go a long way in improving the efficiency of operations. We recommend that the Director-General should not be overburdened with responsibilities which may interfere in his timely decision-making. He should be involved only in decision-making at the policy level. The ICAR should identify areas where the Director-General could delegate powers to the Technical Division Heads for making timely decisions by providing necessary administrative support. A Professional management information system should be developed to ensure that decisions taken consequent on the delegation of authority are not at variance with the policies laid down, while making monitoring easier at various decentralized levels.

5.53 We recommend that the Headquarters should decentralize the decision making process by giving more powers to the Institute Directors in specific areas. Each Institute, in turn, must involve the working scientists in its management process and stimulate creativity with a sense of responsibility. This will require decentralization of authority to the project level within the Institutes. This arrangement will reduce the administrative burden on the ICAR Headquarters and the Directors of the Institutes; it will also eliminate unnecessary file work and speed up the total process of research and development.

DEPARTMENT OF AGRICULTURAL RESEARCH AND EDUCATION

5.54 The Department of Agricultural Research and Education (DARE), which was established after the reorganization of the ICAR in 1973, is a welcome step that provides the ICAR with the necessary linkages with other Government Departments and enables it to enter into collaborative agreements with International Agencies. The Director-General of the ICAR is concurrently the Secretary (DARE) to the Government. Since the overall efficiency of the Society depends on the functioning of these two organizations, it is necessary to delineate their respective responsibilities and spheres of activities. Further, the ICAR should be authorized by the DARE to directly deal with Departments/Ministries of the Government of India as also Foreign Governments and also to enter into International/Bilateral Agreements, wherever necessary.

LINKAGES OF THE ICAR WITH OTHER CONSTITUENTS OF THE NATIONAL AGRICULTURAL RESEARCH SYSTEM

5.55 As the co-ordinating agency, the ICAR has to maintain close working relationships with the SAUs and all other agencies involved directly or indirectly in agricultural research, education and related areas.Complementarity in research efforts amongst the agencies is necessary in order to optimise resources.We recommend that the ICAR should play a major role in strengthening these relationships both by formal arrangements and informal exchanges.

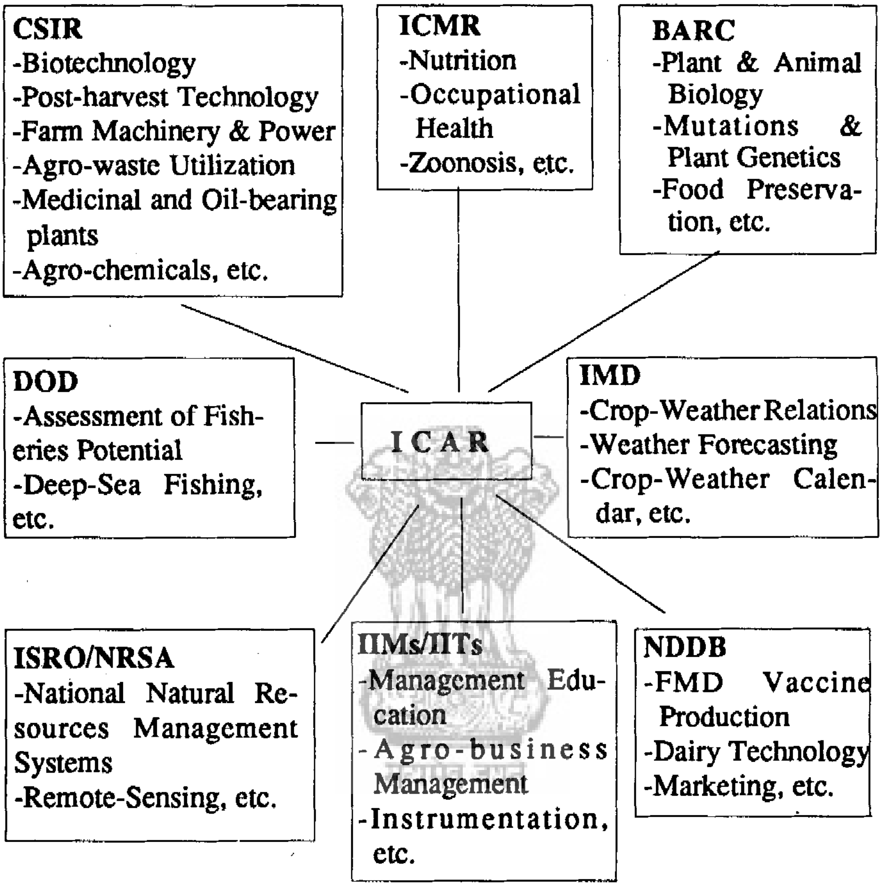
5.56 While bilateral collaborative research efforts do exist between the ICAR and the CSIR, ICMR, ISRO, BARC, etc., we feel that there is further scope for improving it by sharing facilities and developing complementary research programmes.We recommend that a suitable mechanism by which the scientists from these Institutes could come together and exchange ideas for developing complementary programmes should be evolved as indicated in the linkage chart at page number 60. Efforts should also be made to activate the ICAR Joint Panels with these scientific organizations.

5.57 To promote the participation of the industry in the R & D activities, the Government offers certain fiscal incentives. Under this scheme, some private and voluntary organizations either undertake research on their own or sponsor research projects at approved research Institutions. We recommend that efforts should be made by the ICAR to integrate these programmes into the national research infrastructure.

INTERNATIONAL COLLABORATION IN RESEARCH AND EDUCATION

5.58 Development of the concept of international agricultural research is the most revolutionary idea which has influenced agriculture in the 20th century and the International Agricultural Research Centres provide a mechanism that draws upon the global stock of knowledge, scientific talent and plant material to address some of the urgent needs of the developing countries, specially for food production. The ICAR has Memoranda of Understanding with the ICRISAT, CIMMYT, CIP, IRRI, ICARDA, IITA, IFPRI, ISNAR and IBPGR. Of these, the ICRISAT has its world headquar-

LINKAGES OF ICAR WITH OTHER SCIENTIFIC ORGANIZATIONS/DEPARTMENTS FOR COLLABORATION



CSIR
- Biotechnology
- Post-harvest Technology
- Farm Machinery & Power
- Agro-waste Utilization
- Medicinal and Oil-bearing plants
- Agro-chemicals, etc.

ICMR
- Nutrition
- Occupational Health
- Zoonosis, etc.

BARC
- Plant & Animal Biology
- Mutations & Plant Genetics
- Food Preservation, etc.

DOD
- Assessment of Fisheries Potential
- Deep-Sea Fishing, etc.

ICAR

IMD
- Crop-Weather Relations
- Weather Forecasting
- Crop-Weather Calendar, etc.

ISRO/NRSA
- National Natural Resources Management Systems
- Remote-Sensing, etc.

IIMs/IITs
- Management Education
- Agro-business Management
- Instrumentation, etc.

NDDB
- FMD Vaccine Production
- Dairy Technology
- Marketing, etc.

ters at Hyderabad (India), the CIP and the IRRI have their regional representatives located in India, and the IBPGR is in the process of doing so. The International centres transfer germplasm, improved plant material, methodologies and technologies through the all-India co-ordinated research schemes, international workshops, training programmes, exchange visits of scientists and consultants. They also have some collaborative programmes with the relevant central Institutes of the ICAR. No doubt the ICAR is making use of all these mechanisms, but the ICAR Institutes and the SAUs should make a better use of the opportunities which the Consultative Group (CG) centres offer. Steps should be taken to accelerate the spread of improved technology, specially in potato, pulses, groundnut, millets and other commodities of concern.

5.59 The ICAR co-ordinated crop improvement programmes and commodity Institutes should develop intensive collaboration with the CG centres in raising yield plateaus, diversifying parental lines for hybrids, incorporating traits of resistance to diseases, pests and environmental stresses, and improving quality of crops. Partnership should be developed in strategic and basic research, particularly in new areas of research such as biotechnology, improvement of quality of products and sustainability of agriculture.

5.60 Next to germplasm, basic and improved, the second most important contribution of the CG centres is human resources development through training.We feel the ICAR has not exploited this potential of the CG centres fully. We recommend that the ICAR should develop a dynamic programme for human resources development, particularly by encouraging the newly recruited young scientists of the ARS to benefit from the training at the CG centres. In fact, the ICAR should develop a good exchange programme of visiting scientists with the CIMMYT, CIP, ICRISAT, IRRI and other relevant CG Centres. Experienced Indian Scientists from the Institutes as well as the SAUs, should be encouraged to spend their sabbatical leave with these centres. The CG centres are committed to researches relevant to developing countries, and it is the spirit of working together by the national and international system that a synergistic effect can be produced. Indian scientists should be encouraged to attend the IARC Workshops, field days and planning meetings as it is the best mechanism of strengthening the cooperative linkages.

5.61 The ICAR and some of the CG centres have joint Policy Advisory Committees. Many ICAR scientists are members of the Governing Boards of the CG centres. The ICAR should make an efficient use of this vantage position for the benefit of Indian agriculture. We recommend that the ICAR should have a scientific liaison man of sufficiently high level to provide effective linkages with the CG centres. We also recommend that the Policy Advisory Committee should provide general guidelines about the problems on which joint researches should be carried out by the CG centres and the Indian research programmes. The ICAR should encourage scientist-to-scientist collaboration and monitor and evaluate the progress. It may even consider assisting the CG centres with their programmes for strengthening the National Agricultural Research System.

5.62 It is a matter of pride that Indian scientists form the third major community of principal scientists in the CG system, but eminent Indian scientists should be provided with facilities and privileges attractive enough to prevent brain-drain.

5.63 Indian agricultural research is recognized as model of excellence by many developing countries. We, therefore, recommend that the ICAR should consider developing consultancy service and foreign technical assistance programme in agricultural research and education for the benefit of the third world as it will be the best service to humanity.

GROWTH AND DIVERSIFICATION OF THE ICAR

5.64 In the recent years, there has been a rapid and significant expansion in the research, education and extension activities of the ICAR, contributing to rapid advances in many areas in the production front. During this period, many State Agricultural Universities have been established to tackle problems of regional nature. The ICAR, therefore, should now address itself to national agricultural priorities and, through planned in-ordinated research diversify region-specific crops and animals to the different agro-climatic regions of the country.

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CHAPTER 6

ICAR INSTITUTES - THEIR ROLES AND RELATIONS WITH THE HEADQUARTERS

6.1 The ICAR has established a network of Institutes, National Bureaux, All-India Co-ordinated Research Projects, Project Directorates and National Research Centres to carry out its research mandate. These Institutions mainly work on problems of national importance with some focus on regional problems as well. Many of them have substations to serve as a testing ground for the technologies developed under different agro-ecological situations. These Institutions distributed throughout the country are guided and serviced, both technically and administratively. by the ICAR Headquarters. Towards ensuring greater effectiveness of these Institutions in their functioning, the ICAR from time to time has taken steps to decentralize the decision-making process through delegation of powers to the Directors of Institutes. Individual Institutes are assisted by various bodies like the Staff Research Council on technical matters and the Management Committee on broad policy and financial matters.

6.2 The timely availability of resources and other facilities in the Institutes and the creation of a scientific working atmosphere with least Governmental control are the major factors which greatly influence their research output. The kind of relationship that the Institutes maintain with the ICAR Headquarters plays an important role in shaping the overall functioning of the ICAR system.

MANDATE OF THE INSTITUTES

6.3 Each ICAR Institute should operate with a specific and definite mandate and a clearly defined set of objectives. While redrafting the mandate and objectives of the Institutes, the changed agricultural research scenario in the country with regional research primarily being undertaken by the SAUs should be taken into account. The mandate so redrafted should be considered and approved by the Governing Body within the framework of the overall research planning and policy of the ICAR. Thereafter, each Institute should develop its five-yearly research programme, reviewable every year, which should be approved by the Management Committee of the Institute, on the recommendations of its Research Council.

Relationship of the ICAR Headquarters with the Institutes

6.4 Defining research priorities, continuous involvement in planning, evaluation and monitoring of research programmes, and the strategies for their implementation, instead of the five-yearly ritual of getting a stream of proposals from the Institutes and Universities and other bodies, should be the work culture of the Headquarters. The main emphasis at the Headquarters should be to allocate priorities to the research proposals on the basis of objectives and strategy and within the overall limits of the availability of funds. As stress has to be laid on encouraging scientists to develop innovative ideas, the proposals should be examined primarily in keeping with the objectives and strategies and not on the basis of methodology or the requirements of personnel and equipments. The Headquarters should provide assistance to the projects approved by suggesting inputs from other disciplines and agencies, by having continuous six-monthly audit of scientists and equipment to know their deployment, activities and utilization, and by constant monitoring of the progress of the projects based on targets through computerized programmes, PERT charts and reports which should be available on live terminals.

Communication between the Institutes and the Headquarters

6.5 When the Institutes receive a multichannel communication from the Headquarters, one on administrative matters, and another on technical matters, it becomes difficult for the Institutes to maintain a proper follow-up of their correspondence with the Headquarters. The delays experienced by the institutes on matters requiring timely action by the Headquarters lead to the Institutes' losing confidence in the Headquarters. We recommend that the ICAR Headquarters has to ensure timely action on all matters related to the Institutes by effecting necessary modifications in the current operational procedures at the Headquarters. The Institutes attach more importance to administrative, personnel and financial matters than to technical matters, it does not reflect their scientific image. We suggest that the Institutes should reverse this trend and send all their technical reports to the Headquarters in time so that proper monitoring is possible. Such reports should be critically reviewed by the Headquarters and not be treated as a formality. We have recommended earlier that the dichotomous structure at the headquarters should be removed and the administrative and technical streams merged.

6.6 We strongly feel that the recommendations made by the Institute

Management Committees and Quinquennial Review Teams should be given due importance. Necessary authority be given to the Management Committees for a more meaningful functioning. A mechanism should also be worked out at the Headquarters to maintain a proper follow-up on these recommendations towards building up confidence of the Institutes.

6.7 Both the ICAR Headquarters as well as the Institutes should shed bureaucratic ways of functioning and outmoded methods of file keeping, which it has probably inherited by its long association with the Government secretarial system. Modernization of office procedures is a must, and more effective ways of functioning without extensive notings in files should develop. We strongly recommend the use of modern electronic equipments, including computer systems, microfilming of records, etc., to be introduced immediately at both the Headquarters and Institutes. All service records of employees can be effectively computerized and stored. Similarly, manpower data bases can be maintained more effectively. Software packages for many of these operations are readily available and can be used with appropriate modifications. This will introduce qualitative strengthening of the work and quantitative reduction in staff.

Autonomy of Institutes

6.8 There is a need for the ICAR to clearly redefine the responsibilities and powers of the Headquarters as well as its Institutes. We suggest that the ICAR should consider more decentralization of administration by giving autonomy to the Institutes specially in the technical, financial and operational matters. The Institutes serve as the repository of information on all technical matters related to agricultural research, and necessary technical expertise to perform research also lies in the Institutes. Therefore, we recommend that they should be endowed with adequate technical autonomy in terms of freedom for planning, implementation and monitoring within the priorities allocated to the Institute. To exercise such technical autonomy, it is necessary to provide the required financial and operational autonomy to the Institutes. Once the budget is sanctioned and programmes are decided, the Institutes should have operational freedom in utilizing the funds within the broad guidelines provided by the Headquarters. Once the Institutes are provided with this kind of autonomy, the ICAR can enforce accountability and the Institutes can develop into Centres of Excellence.

6.9 Autonomy of functioning is to be linked with accountability. It is necessary for the Directors to be aware of the financial, administrative and human resources management. The Committee recommends that a workshop or training programme covering these aspects may be periodically organized by the NAARM for the Directors wherein inputs from other scientific organizations may also be included.

Management Committees

6.10 With the second major reorganization of the ICAR in 1973, the functioning of the ICAR Institutes was streamlined. Each Institute of the ICAR has a Management Committee except the IARI and IVRI, which being deemed-to-be universities have Management Boards instead. Under the Chairmanship of the Director of the Institute and represented by the ICAR Headquarters, Institute's scientists, research establishments and user departments in the region, this Management Committee exists to broad-base the decision-making on all Institute matters. Since specific powers have not been given to this Committee, it remains only as a recommendatory body at present. It has also little role to play in the review of the Institute's programme and allocation of resources to the projects. The Committee has, thus, no powers to help the Institute's administration.

6.11 To make the Management Committees more effective, we recommend the following composition:

(i) Director of the Institute - Chairman
(ii) Two experts from outside the ICAR system - Members
(iii) Three Heads of the Division of the concerned Institutes (by rotation) - Members
(iv) One Project Co-ordinator - Member
(v) One representative of the Internal Financial Adviser, ICAR - Member
(vi) One representative of the Director-General, ICAR - Member
(vii) One representative of the State Government concerned - Member
(viii) One representative from another associated ICAR Institute Member
(ix) Two representatives from user agencies. In case of NDRI, NDDB should be represented on the Management Committee. In other cases, the Development Boards/ Corporations and Cooperative Federations could be considered - Members
(x) Senior-most Officer in the Administrative Cadre of the Institute-Member-Secretary

6.12 The Management Committee should meet regularly and should have full responsibility with authority to deal with all operational and management matters and be accountable for its actions. We recommend that necessary technical, financial and executive powers should be vested with the Institute Management Committees. Once the budget is allotted to the Institutes, complete authority should be given to these Committees for its operation without much interference by the Headquarters. Most of the decision-making processes in the Institutes should end at the level of the Management Committee itself. We recommend that the ICAR should give enough authority to the Management Committees of the Institutes and their recommendations be given the required attention. These Committees, in effect, should function like the Governing Body of the ICAR or the Management Boards of Agricultural Universities.

Powers of the Management Committee

6.13 Powers may be delegated to the Management Committees in the following specific areas:

(a) To finalize the budget proposals;
(b) To approve the work programme of the Institute on the recommendations of the Research Committee and within the overall Research Policy of the Council;
(c) To approve the constitution of Selection Committees/Boards;
(d) To sanction the execution of works programmes within the sanctioned budgetary limits;
(e) To finalize proposals for import of foreign equipment and opening letters of credit;
(f) To finalize proposals for customs clearance and release of foreign exchange;
(g) To approve proposals for acceptance of external assistance;
(h) To approve proposals for consultancy services to be undertaken by the Institute or its staff members;
(i) To approve purchase proposals of the Institute in respect of major items of materials and equipment and to consider other financial proposals beyond the purview of the Director;
(j) To consider all other matters expedient in the interest of the Institute and to make suitable recommendations to the Director-General.

Procurement, Custody and Accounting of Stores

6.14 Till 1966, the ICAR was utilizing the service of the DGS&D like any other Government Department and also following all Governmental rules in the matter of procurement, custody and disposal of equipment and stores by different Institutes. After its reorganization in 1966, the facility of "direct demanding officer" was withdrawn and the ICAR was made a "pre-deposit party", under which system, the ICAR was empowered to avail of the facility of operating upon the rate contracts of the DGS&D only after making deposits of the estimated cost in each case. This system is reported to have not been working satisfactorily. There are also inordinate delays, cases of unsatisfactory supplies at times, and difficulty in making final adjustments of the advances paid. This was commented upon adversely by the Audit.

6.15 The ICAR appointed a Committee of Departmental Officers under the Chairmanship of the Secretary, ICAR, to go into the whole issue of purchases of stores through the DGS&D. The Committee considered two alternatives: (a) the ICAR Headquarters to take up purchases centrally, and (b) the Directors of Research Institutes may be allowed full powers. The Committee felt that the Institutes did not have the necessary expertise in purchase matters and may not be able to carry out this function efficiently. Taking over the purchase functions from the DGS&D by the ICAR was also not considered an appropriate solution because all the advantages of bulk purchases (for all Government organizations) as is done in the DGS&D would be lost, and the delays inevitable in centralizing the purchases would still continue. This Committee had recommended that the existing purchase powers of Director without having to go to the DGS&D be enhanced so that there may not be difficulties in timely purchases of most of the requirements.

6.16 In the CSIR., the National Laboratories/Institutes make the purchases of stores which are covered by rate/running contract through the DGS&D. However, scientific equipments and machinery are purchased directly by the laboratories in accordance with the procedure prescribed by the Government. It is understood that this system has not been working satisfactorily and that the CSIR has thought of revising the whole purchase procedures. This is reported to be still under finalization.

6.17 In 1983, the Scientific Advisory Committee to the Cabinet (SACC) recommended a series of measures for simplifying administrative procedures and delegating enhanced powers to the Scientific Departments and

Organizations. Based on this, the Government of India issued general instructions in December 1983 which inter alia provide as under:

> "Scientific Departments/Organizations are exempted from the purview of the DGS&D for purchase of stores and disposal of surplus stores. This delegation is subject to the condition that they would evolve suitable procedure for the exercise of these powers in consultation with their internal finance."

Unfortunately, the ICAR has so far neither withdrawn from the purview of the DGS&D nor evolved any procedure in spite of the simplification of the procedures authorized by the Government. It is understood that in October 1986 the ICAR constituted another Committee of Departmental Officers under the Chairmanship of the Director, IARI, to identify the bottlenecks that cause delays and over-runs under the present system of procuring stores through the DGS&D, suggest alternative methods of stores purchases and inventory control, and prepare a draft Stores and Purchase Manual that could be followed by different Institutes. This Committee has not yet made available its final report, although this was expected to have been submitted by 15 November 1986. The result is that this system still continues to be in force.

6.18 We are of the considered opinion that procurement of scientific stores is a very complex area of administrative needs, and requires specialized knowledge on the part of those handling procurement, custody and disposal of scientific equipment and stores. Moreover, the quality of the material purchased, its inspection and timely availability are important for scientific laboratories. We, therefore, recommend that:

(i) The ICAR should immediately withdraw itself from the purview of the DGS&D but may avail of its services at discretion as and when considered advisable in the larger interests of the ICAR;

(ii) For the purchase of scientific stores, equipments, glassware and chemicals and also all other major items of frequent use, the Headquarters should assume full responsibility for entering into rate contracts with different manufacturers and/or other agencies supplying these materials, so as to ensure quality of the supplies according to the given specifications and competitive rates as also timely availability of materials.

(iii) The Research Institutes should thereafter function as "direct demanding officers" to operate upon the rate contracts entered into by the Headquarters, for procuring supplies directly without any reference to the Headquarters.

(iv) For items for which no contracts are entered into or where specific items of equipment are not available through these rate contracts, the Directors of the Research Institutes should enjoy full powers for making direct purchases on the basis of limited tenders/quotations as per the procedures prescribed under relevant rules and/or through the Purchase Committees to be set up at each Institute. The Management Committees should also be involved in the finalization of proposals involving relaxation of normal purchase rules.

Research Responsibility of the ICAR Institutes

6.19 The ICAR Institutes and their sub-stations had all-India functions before the Agricultural Universities were established in different States. Since the Agricultural Universities are looking after the state problems and are strengthening their research capabilities through the AICRPs and the NARP, the need and functions of the sub-stations of the ICAR Institutes need reconsideration.

6.20 We recommend that the ICAR Institutes should confine themselves to more basic and strategistic research or such other problems of national importance. They should undertake research through their sub-stations only on such regional problems for which the required facilities are not available at present or which cannot be created by the SAUs. The ICAR should consolidate the activities instead of multiplying them. The activities and responsibilities of the sub-stations of the ICAR in the light of the transfer of regional research responsibilities to the SAUs have been reviewed earlier by the Arakeri Committee, which had recommended the transfer of many sub-stations of the ICAR to the SAUs of the respective regions. However, for various administrative reasons specially because of the problems of absorption of the ICAR staff in the SAUs, the Committee's recommendations could not be implemented to their logical end. While the mere location of the research stations alone should not be the criterion for their transfer to the SAUs, their programmes and relevance should be critically reviewed in the national context. We recommend that the ICAR may now look into the Committee's recommendations and take appropriate measures for avoiding the duplication of research efforts by its Institute and SAUs.

6.21 The role of the single-commodity/species Institutes has to be clearly defined by the ICAR. Many of the Commodity Institutes have a significant role to play in germplasm collection, maintenance and assistance to breeding at the national level. They should thus complement the regional research work.

6.22 Duplication of research efforts by the Commodity Institutes and the AICRPs concentrating on a particular crop/commodity/species must be avoided. At present, lack of co-ordination among them is reflected in their review mechanism. Some instances brought to our attention include (a) formation of separate Quinquennial Review Teams for SBI (Coimbatore), IISR (Lucknow) and AICRP on Sugarcane when all of them are handling problems on the same commodity; (b) separate QRTs for Co-ordinated Projects and single-crop Institutes like rice, tuber crops, potato, etc. We recommend that the Commodity Institutes and the related AICRPs should be located together wherever possible and their research efforts should be periodically evaluated by a single QRT keeping in view the particular crop/commodity/species they are handling. It is also recommended that sectoral review needs to be attempted once in five years.

Establishment of New Institutes

6.23 With the rapid expansion of the priority areas requiring attention of the ICAR at the national level, the size of its research network and activities got multiplied. Over the years the ICAR has established a large number of Institutes to fulfil the research needs of priority areas. However, in the process, the mandate of many of the existing Institutes have not been redefined when new Institutes emerged. Many ICAR Institutes which were initially working on many commodities/species continue to work on them even after many new Institutes were created to handle specific commodities/species. As a result, there is considerable duplication in the research work being carried out by the former and new Institutes. This leads to unnecessary wastage of our scarce national resources. We feel that there is an urgent need for the ICAR to take a fresh look at the mandate of each of its Institutes and take measures to suitably modify the mandate of the former Institutes in the light of the establishment of new Institutes. In our view, the ICAR may not start any new Institute during the next five years and rather consolidate the present set-up. However, this does not preclude the creation of new Institutes, if otherwise found necessary, by regrouping of the existing activities and by redeploying the existing manpower and other resources.

Provision of Additional Support to the Institute Directors

6.24 In larger Institutes with a number of sub-stations located in farflung areas, the Director is almost always occupied with the administrative and office matters, with the result that he is not able to devote adequate time to research planning, monitoring and evaluation. The Director holds the overall responsibility and control not only for administration, but also for the research activities. There is, therefore, a need to reduce the day-to-day routine administrative burden of the Directors so that they can devote sufficient time to scientific aspects of management and research, as well as visit the stations under their control.

6.25 In order to assist the Institute Director in the discharge of his technical responsibilities, we recommend the appointment of a Joint Director of Resident Research, only in the major Institutes. This can be done by designating one of the existing positions of senior scientists in the Institute. We also recommend the appointment of senior-level administrative and accounting staff at least in the larger Institutes to provide the needed support in administration and accounts, particularly in the context of enhanced delegation of powers to the Directors and the Management Committees, as recommended by us.

6.26 The Directors have to delegate powers to senior scientists like Divisional Heads, Joint Directors, Project Co-ordinators, and to others down the line to the extent necessary, in the day-to-day administrative matters, and, only crucial administrative matters requiring his approval should be brought to his attention. All Institutes should have a build-in monitoring system that would help them to make mid-course correction in their research and development activities keeping newer developments in science in view.

Creation of Proper Working Atmosphere

6.27 For realizing the maximum research output from the ICAR Institutes, it is necessary to create a proper working atmosphere for the scientists. With the larger and multidisciplinary research units having overlapping responsibilities assuming importance, proper provision has to be made for increasing research outlay, especially in terms of facilities. We recommend that the Institutes should be provided with adequate funds and other facilities. The facilities needed by the scientists should be provided with minimum of delay, procedural obstacles that delay decisions have to be overcome.

6.28 In the ICAR the facilities of buildings, equipment, housing, guest houses, transportation, availability of chemicals and materials, books, journals, office equipment such as electronic typewriters, computers, photo-copiers, telephones, telex, projectors, video sets etc. are far below the current needs and standards. Those available are very poor and outdated. They do not stand in comparison with the facilities available with Atomic Energy, Space Research, CSIR, IITs and even some Universities. Air-conditioning equipment, standby power generators, auditorium for lectures, and conference rooms are not available. The laboratories have remained largely in the standards of 1950s or 1960s. Enormous revolutions in scientific instrumentation have taken place in the 1970s or 1980s and this is particularly evident in modern biology and chemical sciences. Automation in analysis, coupled with micro-processors and computers have displaced older equipment. Modern research equipment in top scientific organizations has to be replaced every five years.

6.29 In many of the Institutes that we visited, we were informed that the resources available for the replacement of the existing equipments and buying of new ones were limited. Also, for the maintenance of sophisticated equipments, the available funds were not sufficient. This situation can be overcome by the provision of separate pool of funds and equipments. The ICAR Institutions and the SAUs should receive an additional one-time grant to improve facilities in the course of three to five years for this process. Instrument maintenance workshops with fully trained staff have to be established to service them. In-house power generators and air-conditioning are also needed.

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6.30 We recommend that scientific work culture has to be created in the ICAR Institutes, and the spirit of innovations and experimentation must be encouraged and unnecessary Governmental control should be avoided. A working atmosphere should be created where the scientists at all levels have enough freedom for free and open discussion on scientific matters. Performance and accountability should be linked with appropriate reward and punishment systems built into it.

Need to Nurture Young Scientists

6.31 Special efforts needed to nurture young and promising scientists should be the responsibility of their seniors, specially the Directors of the Institutes. Bright scientists should be identified early enough and be provided with all the encouragement that would help them blossom into brilliant and most productive persons.

Encouraging Generation of Internal Resources

6.32 Many of the ICAR Institutes are generating income through their proceeds of crops produced/value-added products of the crops,livestocks etc. This income is presently going to the general revenue which often results in lack of motivation for the scientists to produce more. We recommend that the ICAR should evolve a suitable mechanism to plough back this income to the Institute fund so that it will be possible to (a) upgrade their capability; (b) replace equipment/pilot plants; (c) bridge the unbudgetted fund requirements, contingency and other research expenditure; and (d) provide incentives for the Institutes to generate more income. The ICAR Institutes should also be allowed to accept sponsored research programmes to generate additional resources.

Staff Research Councils and Institute Research Committees

6.33 The Staff Research Council (SRC) is the most important forum in the Institute to plan, monitor and evaluate research projects. It is expected to review the progress of the ongoing projects, approve the programmes, carry out review of completed projects, identify areas and formulate new projects. Efforts must be made by the ICAR Institutes to make full use of this important scientific body.

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6.34 The present system of review of the Institute's research programmes is primarily restricted to the SRC under the Chairmanship of the Director, with little external input. We recommend that specialized research review teams involving external experts may review the projects before these are considered by the SRC. The SRC may invite senior scientists from Agricultural Universities and other related scientific organizations to help in evaluation of research programmes and to possibly consider inter-institutional collaboration.

6.35 We suggest that the Institutes should have an Institute Research Committee in which the policy-makers, planners, scientists and user departments and farmers can actively participate for identification of problems and for formulation of research projects to find their solutions. This Committee will also have the responsibility of identifying and formulating research projects in relation to the mandate of the Institute and the major programmes decided by the ICAR.

6.36 We also recommend that the Institute's SRC should have discussions mostly on multidisciplinary projects after they are considered by the leaders, associates and Heads of Divisions from the concerned disciplines. Unidisciplinary projects have to be discussed at the Divisional SRC level itself. To make the SRC an effective advisory body, the number of projects should be few and the time devoted for discussion should be more. Effective participation of all the scientists will have to be ensured by the circulation of proposals well in advance. Before approval of new proposals, the SRC should review the resources needed with those available so that the projects, if approved, will not suffer later for lack of resources.

Quinquennial Review Teams

6.37 The Quinquennial Review Teams (QRTs) through the peer group review play an important role in projecting the Institute's programmes and functions in accordance with national policies and priorities. These Teams can play an effective and significant role in giving proper direction to the Institutes from the national perspective. The QRTs should be constituted with eminent persons in the area, and a senior scientist from the Headquarters must act as member-secretary. They should discuss with the Director and scientists in the Institutes, and consider the Management Committee's recommendations before finalizing their reports. We suggest that the ICAR should ensure that review and evaluation by these Teams are carried out at regular intervals and their recommendations implemented.

6.38 The role of the QRTs in redefining the objectives of the Institutes and in assisting the monitoring and evaluation process is discussed in Chapter 10.

Inter-Institutional Linkages

6.39 As an apex co-ordinating body at the national level, the ICAR should ensure effective linkage between its Institutes and the SAUs which form the second main stream of agricultural research and education in the country. We recommend that there should be complementarity in research efforts of the ICAR Institutes and the SAUs. The scientists from the two systems should actively participate in each other's research-planning process and may work out collaborative projects. This will avoid to a great extent the duplication of research efforts in the region. The research facilities and the expertise available can also be shared between the two systems for mutual benefit.

6.40 In addition to establishing close linkages with the SAUs, we recommend that the ICAR Institutes should establish close linkages among themselves. The Institutes working on similar commodities should work in closer unison and share their facilities and expertise. Participation in each other's research-planning process and development of collaborative research projects are necessary. This will indirectly contribute to the consolidation of gains rather than expansion of the ICAR system. Through this linkage, one Institute through its sub-stations may provide facilities for others in testing their technologies at different agro-ecological regions, and enable the ICAR system to utilize the available resources including the scientific manpower more efficiently. Necessary institutional arrangements will have to be made for such linkages.

CHAPTER 7

PERSONNEL POLICIES OF THE ICAR

BUILDING A SENSE OF FRATERNITY AND COMMON CULTURE AMONG SCIENTISTS

7.1 Human resources constitute the most important of all inputs in any organization for it to attain its goals. The effectiveness of a research organization like the ICAR depends upon the quality and quantity of work done by its scientists. The scientists, in turn, have to be effectively supported by technical, administrative and supporting personnel and the necessary infrastructure. Only when every item in the system functions in a harmonious manner will there be profitable return for investment made in research. The aim is to find ways and means by which each individual of the organization can give his or her best in order to get the maximum return from the investment made of public funds. At the same time, the organization should also be concerned with the needs of its employees and their growth and development. When there is a proper match between these two, the organization will be efficient and effective. The personnel policies in the ICAR have to be tailored to its specific needs. These hold the key to the success and effectiveness of the ICAR in fulfilling its mandate.

7.2 Our research system, in spite of several handicaps and relatively low financial support, has given a very high pay-off to the country for the investments made. It is, however, important that the system should be adequately strengthened so that it yields an even larger return. Achieving such an objective calls for identifying and removing the constraints in the organizational structure and overall improvement that tend to reduce the per capita and group productivity of its major resources — the scientists. It is in this context that the personnel policy of the ICAR was restructured as a result of reorganization in 1973. All posts in the ICAR are presently categoried as (i) Scientific, (ii) Technical (iii) Administrative, (iv) Auxiliary and (v) Supporting.

7.3 The main thrust of the reorganized personnel policies is on better service conditions comparable to any other services in the country to attract best talent for research with good facilities and a good environment for research, job satisfaction, adequate opportunities for career development, professional and personal growth by providing opportunities for advanced studies and training. Despite this we feel that, at present, the service conditions of some other all-India services, banks and the private sector are probably more attractive and the best talent is not opting for a research career.

7.4 For scientific staff, an Agricultural Research Service was started from 2 October 1975. The service was designed to replace the then existing "post-centred" system by a "scientist-centred" system. The most significant feature of the service is that promotions are made irrespective of the occurrence of vacancies, on the basis of rigorous periodic assessment by a panel of eminent scientists. This is intended to obviate the unhealthy rivalry among scientists for having to compete for higher posts and to look upon their fellow scientists as competitors. The new system is intended to generate a sense of fraternity and scientific culture for fostering co-operation and team-work which is essential in agricultural research, particularly in multi-and inter-disciplinary research. The system also provides the opportunity for continuous professional growth and life-long specialization without any constraint and to promote individual and collective initiative for improving the productivity of research and its application in matters relating to all aspects of agriculture.

7.5 The perspectives of agricultural research, education and extension have to be reoriented to meet the future needs and challenges. Because of the limited land, water, and energy resources, rising costs of labour and inputs, demands for improved diets and population growth, all projections indicate that more science and technology input must go into agriculture to double crop production and substantially increase livestock and fish production in the next two decades. Much of this input will have to be more innovative than before and also non-conventional. It is, therefore, necessary to assess how far the personnel policies initiated and implemented since 1973 have helped the cause. If the system has basic merits, modifications that may be needed as a result of experience and for the new challenges ahead need to be introduced.

7.6 The Committee's assessment is that in view of the increase in the size of the organization and the problems relating to the implementation of the policies, certain difficulties and anomalies have arisen resulting in a measure of discontentment amongst the ICAR personnel.

7.7 The personnel policies of an organization broadly include manpower planning, selection of the best from among the qualified people, orientation and training to understand the ICAR system and its working and scientific culture, placement, on-the-job training, an initial period of involvement in research project under guidance leading to individual project work, and provision for the continuous professional growth and development of the individual. Further, training has to be recurrent and given at periodic intervals to enable the scientists to be exposed to advances in knowledge and to adapt to the changing needs.

MANPOWER PLANNING AND CADRE MANAGEMENT

7.8 The manpower planning for each institute or unit of the ICAR should be on the work load, i.e. the on-going research projects and new research projects that are to be taken up during a five-year plan period and the additional manpower required for it. This exercise at each institute and unit of the ICAR should start two years before the commencement of the next five-year plan in which adequate provision should be made for the required number of scientific, technical, administrative and supporting staff, keeping in view the nature, quantum and duration of work involved. Based on the requirements of each Institute and unit, the manpower for the different categories for the entire ICAR for a five-year period should be worked out. Since the nature of work and requirements of different categories of manpower vary from project to project and institute to institute, it is not easy to prescribe norms for the ratio between different kinds of posts. It is, therefore, appropriate if the requirements are worked out by each institute according to the needs of work. An appraisal of manpower requirements on a project basis should be carefully carried out for each Institute. Whenever new projects are formulated, the staff requirements should be met essentially by redeployment. Increase of staff by accretion alone should not be permitted. In some Institutes, the number of scientists is more than the actual requirement. The ICAR has to evolve suitable mechanisms to maintain the number strictly according to the requirements as has been done by the NDDB after the merger of the IDC with it.

7.9 Within the ICAR system, there are about 6,000 scientific positions, of which about 2,000 are vacant. There is pressure for filling them up soon. For rapid agricultural growth, diversification and capitalization on the frontier areas of research is important. A careful examination of the available scientists and their specializations and experience could lead to redeployment of a substantial number to other innovative applied research projects. The existing vacancies and other positions released could be redeployed for newer areas and newer Institutes and units to the extent that is possible without affecting the on-going programmes. The Committee is strongly of the view that if the ICAR research system has to be effective, redeployment and restructuring of the existing cadre strength and its proper management are essential pre-requisites. This needs continuous analysis and monitoring to make adjustments. It is also necessary to develop a cadre-management policy at the Institute level with emphasis on disciplines and sub-disciplines to promote excellence. An appropriate structure should be designed to reflect the sub-disciplines with suitably designated scientists of appropriate rank. Guidance from the Headquarters would be needed in this regard to some of the Institutes.

7.10 In any system, an environment conducive to creative research is necessary as an incentive for the scientists. Apart from this, at the helm of affairs, the scientific community itself should play a major role in creating such an environment. At the start of the career, the scientists' major concern should be to learn and participate in the research process and not worry about grades and promotions. Inspiration plays a significant role, and the senior scientists have the major responsibility in providing this. A good work culture, access to information and facilities, opportunities to participate in discussions and argue on scientific problems are vital. This could be provided only by outstanding scientists. Once a person gets absorbed in the pursuit of scientific progress and knowledge, commitment is developed; once committed, other attractions become secondary.

SCIENTIFIC CATEGORY

Agricultural Research Service

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7.11 The Agricultural Research Service (ARS) is a centralized service covering all the Institutes of the ICAR as well as its Headquarters. Although the positions in scientific category in the ICAR cover as many as 8 grades, the ARS itself covers only the following three grades, the others grades being outside the service:

S-1	Rs 700-1300	(pre-revised)
S-2	Rs 1100-1600	”
S-3	Rs 1500-2000	”

7.12 A unique feature of the Service is the system of promotion from one grade to another irrespective of the occurrence of vacancies on the basis of periodical assessment. To facilitate the working of this system, there is a combined cadre strength for all grades of the Service. The Service also provides for promotion to grades S-4 and above on personal basis to scientists in recognition of their outstanding performance in research.

7.13 In discussions with us, the members of the scientific community repeatedly urged that the scope of the Service be enlarged to cover all the scientific positions in the ICAR instead of only being limited up to S-3 level. It has been emphasized that the present division of grades, i.e. those of the ARS and those outside it, is not only artificial but it severely restricts the advancement of the scientists in their career, causing stagnation at the higher levels of the Service. In view of this, and in view of the fact that the Service, in any case, provides for advancement beyond S-3 level on personal basis, the Committee feels that there is no need to keep the scientific positions in two separate divisions. The Committee would, therefore, recommend that the ARS should be enlarged to include grades up to S-6 with the five-yearly assessment being adopted right through. No post in S-7 currently exists. The grade S-8 should be the grade only for the Director-General, who is also Secretary to the Government. However, the criteria for assessment of scientists for promotion beyond grade S-3 should be more stringent so that only highly deserving scientists are permitted career advancement on the basis of their outstanding performance.

Recruitment

7.14 The entry into the ARS at S-1 level is made through an all-India competitive examination which includes both a written examination as well as interview by expert panels. The examination is conducted at present in 57 subjects. Any candidate within the age group of 21-30 years with a Master's degree or equivalent has a chance to compete. In the opinion of the Committee, this is an appropriate procedure for attracting young promising scientists from diverse fields to the ICAR system. The examination is conducted by the Agricultural Scientists Recruitment Board (ASRB), which prescribes a syllabus for each subject and the mode of the examination. Since these syllabii were introduced as early as 1976, the Committee would suggest updating the same for each discipline and for introducing improvements in the formulation of question papers and evaluation, using modern educational technology suitable for such a competitive examination.

7.15 While the basic qualification for entry into the ARS continues to be a Master's degree, realizing the dearth of adequate number of qualified persons in the field of engineering and technology, the ICAR has relaxed the requirement of Master's degree for these subjects, making Bachelor's degree-holders in these subjects eligible for entry into the ARS. In the field of Veterinary and Animal Sciences also, we find that there is a serious dearth of qualified persons. There are reported to be a large number of vacancies in these disciplines (more than 100 posts are reported to be vacant at the IVRI alone), but the prescribed qualification for these disciplines continue to be Master's degree. We have given a careful consideration to this aspect and feel that for carrying out effective research in any discipline of agriculture, it would not be advisable to lower the qualifications below Master's degree for entry into the ARS. However, to meet the reported shortage of persons, we would recommend that while the basic qualifications for entry into the ARS should continue to be Master's degree in all disciplines, the ICAR should make special endeavours to encourage the acquisition of higher academic qualifications in both these disciplines, viz. Engineering and Technology as well as Animal Sciences and Veterinary Sciences. For this, we would recommend that (i) at least 50 fellowships be awarded to those seeking admissions to Master's degree in these two disciplines every year over the next five years; and (ii) five additional increments be allowed to those who enter the ARS as a result of competitive examination for S-1 with an M.V.Sc. or M.Tech. degree. This step will serve as a good incentive to the candidates to enter into these scientific streams of agricultural research.

7.16 After the selection of candidates through the examination, the scientists are required to undergo an orientation training at the NAARM. Over the years, the training programme conducted by the NAARM has been reviewed and improved upon, making it more appropriate to the needs. After training, the scientists receive on-the-job training in their special subjects and exposure to the broad research activities of the particular Institute or Centre of their posting. The Committee would like to recommend that the scientists should at initial stages be posted in developed Institutes under senior scientists so as to enable them to gain experience and expertise in their own area. Further, since the ICAR is allowing a large number of persons with post-graduate degree in basic sciences to be recruited to the ARS even in applied disciplines, it will be necessary that they are given proper orientation and training so that they are in a position to discharge the research responsibilities assigned to them.

Revision of the ARS Disciplines

7.17 At present, 57 disciplines are listed in the ARS for recruitment. Some discrepancies have been reported in the placing of candidates selected for certain disciplines. There is therefore a need for further examination and revision of the list of disciplines and addition of some more disciplines. For example, candidates with specialization in Animal Genetics are selected for posts in Fish Genetics and those with qualification in Veterinary Microbiology to Fish Microbiology. Even though disciplines of Animal Genetics and Microbiology are similar in general principles to Fish Genetics and Microbiology, there are some major differences in details. Thus, the selected candidates have to be again trained in the particular disciplines of Fish Genetics and Fish Microbiology to meet the requirements of the Institutes. Similarly, for posts in Dairy Engineering, candidates with qualifications in Agricultural Engineering are selected, since Dairy Engineering as such is not included in the list of disciplines, even though candidates with Dairy Engineering qualifications are available in the country. Similarly for posts in the NAARM, qualifications and experience in management/research management/educational technology is necessary. But these disciplines are also not included in the ARS lists. Hence the Committee would suggest the revision of the list of disciplines, modify it or add more disciplines. The Committee would also like to recommend that wherever it is not possible to select suitable candidates through open competitive examination, separate recruitment may be made even to S-1 grade by open advertisement to get the scientists with required qualifications.

Lateral Entry

7.18 Normally posts in grades S-2 and S-3 of the Service are filled by promotion on the basis of five-yearly assessment. At the same time, the ARS rules provide for direct recruitment to posts in these grades if suitable scientists are not available through promotion. The Committee would like this provision to continue. This provision should also be extended up to grade S-6 consequent upon inclusion of grades up to S-6 level within the ambit of the ARS. In order to ensure the induction of scientific talent from outside the ICAR system, it is recommended that 25% of the total cadre for positions from S-4 to S-6 levels may be filled by direct recruitment. The persons selected against these positions may, as far as possible, be from outside the ICAR system. That is to say, if in a given year the ASRB makes recruitment of, say, 100 scientists in the grades S-4 to S-6, the number of persons from outside the ICAR system should be at least 25.

7.19 The underlying idea of the system of promotion on five-yearly assessment irrespective of the occurrence of vacancies is to enable a scientist to grow in his own position without changing his discipline or post or without unnecessarily competing with colleagues. In the present system, a scientist is eligible for screening for promotion or grant of advance increments, after the expiry of a period of five years. While this system has been generally welcomed by the scientific community, certain distortions have been brought to the notice of the Committee. For example, a scientist who is not adjudged as suitable for promotion or increments in a particular year is reassessed in subsequent years till he is found suitable for promotion. Also, a provision exists for review of cases of scientists not found suitable in a particular year. In the opinion of the Committee, the system of reassessment or review every year defeats the very idea of making selection of meritorious scientists. The Committee has, therefore, very carefully considered the existing system of assessment and would like to make the following recommendations so as to make the system more meaningful:

(i) A scientist may be given a total of 3 chances in a particular grade for assessment for promotion/advance increments as against unlimited number of chances as at present.

(ii) The reassessment of a scientist not found suitable for promotion/advance increments may be done every alternative year instead of every year.

(iii) The system of review or re-review of cases of scientists not found suitable may be discontinued.

(iv) The benefit of assessment/advance increments to scientists may be given immediately from the very next month of crucial date of assessment (instead of allowing after six months as at present), after completing the administrative formalities.

(v) The performance of a scientist in a deputation post should be treated at par with the performance in the ICAR for the purpose of assessment, regardless of the fact whether functions in a deputation post are related to the functions in the ICAR Institutes or not.

Research Management Positions

7.20 Apart from the ARS, separate rules have been prescribed by the ICAR for higher scientific positions known as research management positions. These positions cover the following grades:

S-4	Rs 1800-2250	(pre-revised)
S-5	Rs 2000-2500	"
S-6	Rs 2500-3000	"

S-7	Rs 3000/- fixed (pre-revised)
S-8	Rs 3500/- fixed ”

In this category, The posts of ADGs, DDGs, Directors of Institutes, etc., are covered. These posts are filled by advertisement for a fixed tenure of five years subject to renewal for another term not exceeding five years. After the completion of the tenure, the scientists are expected to go back to active research. In practice, however, they seldom return to active research and prefer to continue in the research management positions.

The Committee would like to emphasize that there should be no research managerial cadre as such. The posts of ADGs, DDGs, Directors of the Institutes, etc., should be filled by direct recruitment on a tenurial basis from amongst scientists with a good record of scientific achievement. For posts of Directors, the incumbents should, in addition to being outstanding scientists, have the required administrative and managerial ability. The system of tenurial appointment to these posts should be strictly enforced so that on completion of the tenure, the services of the incumbents are made available in the field of active scientific research. However, in the case of research management scientists of proven ability, whose continued presence in the ICAR after the expiry of the tenure or the extended tenures is considered advisable in the larger research interest of the ICAR it should be open to the ICAR to finally absorb the research management scientists coming from outside the ARS system against the sanctioned positions in the ARS in equivalent grades.

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7.21 At present for recruitment to research management positions 3 to 7 years managerial experience as Head of Division, Project Co-ordinator, or Project Leader is prescribed. There is a keen desire and competition among scientists to somehow acquire this type of experience to be eligible for appointment to research management positions. This scramble vitiates the atmosphere for the scientists in the formative years of their career. Instead of striving for leadership in science and making contributions in their own discipline or sphere of activity, they try to get positions having managerial experience. The result has been that the culture of science and scientific research is getting a setback all along the line. This seems to have done damage to the research system and has created a class-consciousness amongst the scientists. The Committee would like to recommend that for the purpose of recruitment to research management posts, the requirement of previous experience in a managerial post should not be an essential qualification. The scientists who have made notable contributions to science and have management capability should head the Institutes or divisions to improve the quality of research and work output of the research Institutes. They will, however, need further training in management and administration which could be arranged for them on the job.

7.22 The Committee would also like to recommend that there should be no inter-se seniority between the scientists holding scientific posts or research management posts in an Institute in any grade, except for the limited purpose of officiating in any leave vacancy of short duration. For this purpose, keeping in view the criterion of length of service in a grade, scientists who join earlier in any grade should be considered senior to those who join later in the same grade.

Rotation of Heads of Divisions in the ICAR Institutes

7.23 At present all positions of Heads of Divisions except those held by permanent Heads of Divisions who have not opted for the ARS are filled by rotation amongst S-3 and S-4 scientists of the ARS or non-ARS scientists holding these grades of pay on the basis of performance, professional ability and annual assessment reports. S-2 scientists are considered for holding these positions if S-3 and S-4 scientists are not available. The present term of these posts is three years with a provision of another term of three years in deserving cases. It has been expressed quite strongly by the scientists that the rotation system has brought in deterioration of leadership in science in the Institutes and that there has been a lack of proper direction and control. In addition, a serious disability in the system has arisen due to inbreeding because nobody from outside can come. The Heads of Divisions are hesitant to take decisions and implement authority as supervisory scientists. The Committee wishes to emphasize that the Head of Division should not only be a leader in his discipline but also a scientist who contributes to manage the research division for achieving the excellence of the division. There is a clear responsibility on him to build the division to a higher level. The present system of rotational leadership is not conducive for this objective and should immediately be dispensed with. The Head of the Division should be a scientist of stature in the area covered by the Division, and should at least be of S-4 level. The post should be filled on a tenure basis for five years renewable for another tenure of five years subject to the incumbent's interest and effective performance. The Committee also recommends that instead of filling up the post of Head of Division by rotation, the post should by filled by direct recruitment without the requirement of previous managerial experience (at present prescribed). Even for higher level posts at present considered as involving management at S-5 and S-6 levels, no previous managerial experience be insisted upon. The emphasis should be on finding scientists from within the ICAR system or outside who have a record of higher scientific achievement. For filling these positions for short periods due to emergencies, a stop-gap arrangement should be made by appointing the senior-most scientist in the grade irrespective of whether he holds a research management position or not. Though there will be no inter-se seniority in the ARS, putting the senior-most person in the grade, is advisable as an interim measure in such exigencies.

AGRICULTURAL SCIENTISTS RECRUITMENT BOARD (ASRB)

7.24 The ASRB was set up in 1976. It is a part of the ICAR system but works independently and is accountable to the President of the Society (Union Minister of Agriculture). It started as a one-man commission and recently it has been enlarged to a three-man commission, one of the persons being Chairman and holding the rank of Secretary to the Government. There is a division of speciality among the three members, one to deal with Crop Sciences, another to deal with Animal Sciences and the third to deal with Basic and Social Sciences including Extension. The rules prescribe the number of external experts representing the necessary specialities for selection for the different categories of posts. All the external experts including the ASRB member have to approve and sign the recommendations concerning the selection.

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Performance Appraisal

7.25 The working of the assessment system has exposed some weaknesses which has resulted in discontentment. Consciously or unconsciously, a lot of subjectivity appears to enter into the annual assessment of scientists by reporting and reviewing officers. The Annual Reports of the scientists should be more specific and reflect on the project activities and achievements of the scientists in their research project. The evaluation of the scientists should be based on objective criteria. The weightage for subjective criteria reflecting the scientist's personality, behaviour, character and other traits should be minimized. It has been expressed that the Peer Review Committee at the five-yearly assessment has to go through very bulky material of assessment proforma and research project files and the time available for the experts is not sufficient for a careful study. While the assessment is for the scientist and his work and comparisons between scientists are not to be made, instances have come to the attention of the review team that comparisons plague the attitude of scientists due to several anamolies inherent in the process. This seems to have given rise to the development of negative attitudes.

7.26 The Committee makes the following recommendations to improve the situation:

(1) The ASRB should examine and introduce improvements in the existing profomma of annual and five-yearly assessment so that as much valid information as possible can be obtained for the assessment by them.

(2) In the Institute itself there must be every two years an evaluation of the progress in the Research Project and work of scientists by a panel of two advisors along with the Head of the Division or Unit and the Director. The advisors will be appointed by the Director for a period of five years in consultation with the Management Committee. The advisors' role would be to review the research projects and the work of the institute during a plan period (five years) to help the Director in monitoring and evaluating the entire research of the Institute. Two advisors with scientific expertise and experience for each broad area of research in the institute may be appointed. While reviewing the Research Projects of a Division or Unit, the Head of the Division and the Director will sit with the advisors in making a critical examination of the project work. While making this review, this team will record their assessment of the work of the scientists in the project. Each set of advisors may be required to spend a week in reviewing the project work and the scientists' accomplishment in a Division. At the end of this review, the deficiencies that have appeared in the project should be indicated to be remedied and the scientists explained the strengths and weaknesses of their performance. All these should be recorded. This feedback will help the scientist to improve his/her performance. Good work done should also be indicated which will be an incentive to further progress. In this way there will be two internal assessments during a five-year period of each scientist's' work. The complete record of these two assessments along with other materials that are already prescribed should be made available to the ASRB at the time of five-yearly assessment. The ASRB Assessment Committee itself should spend one day before the interview to go through all the records and make use of this study in the discussions during the interview. The assessment made in the institute would already have been made known to the scientists and they would have attempted to improve upon the suggestions. The system throughout should be an open one to remove as much of the suspicion and misgivings as possible from the minds of the scientists.

The ASRB may constitute Assessment Committees which may visit each Institute and have on-the-spot interaction with the scientists and their supervisors. Such an interaction will allow assessment of the work done by the scientist in relation to the work assigned to them and work facilities available.

(3) With the strengthening of the ASRB it would not be necessary for the President to nominate two members on the Selection Committee for Grade S-4 and above.

Role of the ASRB

7.27 The ASRB is also vested with the responsibility of recruitment for middle-and lower-level administrative posts. It is recommended that recruitment and assessment of administrative, accounts and supporting staff should be taken out of the purview of the ASRB.

7.28 In the ASRB a broad grouping of three areas as Crop Sciences, Animal Sciences, and Basic and Social Sciences including Extension has been done, and it is indicated that three members have been chosen to represent the three broad areas and assume the responsibility for the respective area. In principle this has limitations because each group has a range of subjects and it is not the member's expertise that matters. The persons appointed to the ASRB are eminent and experienced scientists who have broad knowledge and experience of agricultural sciences. Each one assisted by the external experts in the specialized subject for which selections are held should be able to make an objective assessment of the candidates. It is not necessary that a member should sit in selection in his area of speciality. The ASRB operates around three major areas, viz. (1) Annual ARS examination and direct recruitment, (2) Five-yearly assessment of the scientists in the service, (3) Direct recruitment by advertisement. Specialization around the three areas of responsibility may perhaps be more appropriate among the Board members rather than the subject-matter areas to handle the total task entrusted to the ASRB. Such apecialized effort within the ASRB could result in refinement of the system and its efficiency.

Screening of Applications for Scientific Positions

7.29 At present while the ASRB is charged with the responsibility of making selection in accordance with the prescribed manner, all applications received after the advertisement of the vacancy are forwarded by the Board to the Headquarters for preliminary screening. In our view, this is not advisable. As per the procedure adopted by the UPSC, the ASRB itself should take the responsibility for screening the applications. But they can invite comments of the competent authority in the ICAR before finalizing the list of candidates to be called for interview. Secondly, in our view, the number of candidates to be interviewed should be restricted generally to four times the number of vacancies. Thirdly, it should be within the purview of the ASRB to consider candidates in absentia on the basis of their biodata and other particulars in addition to the system of 'contact' candidates.

7.30 The ASRB should not remain just a recruitment board. It should assume the responsibility for the overall human resources development in the ICAR. It is, therefore, necessary for the ASRB to maintain contact with the career of the scientists selected for the ICAR system. By this feedback the ASRB would be in a position to make refinement in the operation of the Agricultural Research Service and the personnel policies. The ASRB should be charged with the overall human resources development in the ICAR. It is recommended that a research and analysis wing be set up in the ASRB so that research on human capital development in agricultural sciences could be done to help evolve policies for personnel management in the ICAR system. The ASRB should also, using the experience of the last ten years, develop a set of operative procedures which may become healthy conventions.

Autonomy of the ASRB

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7.31 The future of the agricultural research and its application for food production and welfare of the people depends upon the quality and quantity of research work turned out by agricultural scientists. Hence the best talent available in the country should be selected for this work based on merit, and there should not be any sort of pressure or influence on the ASRB, which is the recruiting agency. We, therefore, recommend that the ASRB should be an independent and fully autonomous body to discharge the functions effectively, with its own budget, staff and operational procedures, and may function on the lines similar to the UPSC.

Mobility of Scientists

7.32 The ICAR has to ensure that the whole country gets the benefit of the agriculural research either directly through its Institutes or indirectly through the SAUs. Imbalances among the regions in the country need to be removed. Further, greater attention to backward and remote areas need to be given. In the development of expertise in agricultural research, imbalances in the development of subjects also need attention. To fulfil these needs the ICAR has revised its policies of transfer and deputation of scientists to other organizations. It has also to provide for cross-fertilization of ideas through opportunities for its scientists to work with other agencies related to it. One of the objectives of the ARS is to facilitate the mobility of scientists from one Institute to another, from the ICAR to sister organizations like the State Agricultural Universities, Central and State Development Departments, CSIR, BARC, etc., and vice-versa on deputation basis.

7.33 The Committee recommends that the ICAR should be an open system, allowing free mobility of personnel between the ICAR, its Institutes, Projects, SAUs, General Universities, and Departments of Agriculture and Animal Husbandry. For free mobility of scientists the rules pertaining to deputation may be further liberalized and followed correctly without giving a scope for complaints. Even with the present facilities that the ICAR provides, if there are difficulties in fulfilling these objectives these need to be examined and remedial action taken. For inter- and intra-Institutional transfers, the stations and centres of the ICAR Institutes have been categorized as A, B, C, D and E based on their backwardness. A and B form the first category, C the second category and D and E the third category. The ICAR provides special allowances and other incentives for the staff working in C, D and E category stations and centres. All the ARS scientists are required to work for five years in the first category and four years in the second and third categories together. The transfers are to be made according to the length of stay at a particular place. The ICAR has adopted a policy in the staffing of its Institutes that not more than 50% belong to the State in which the Institute is located, 25% are from adjoining States and 25% from States farther away, in order to promote national integration. While the above policies on mobility, transfer and incentives are laudable, the implementation has suffered in some respect giving rise to complaints.

The new ARS entrants should be placed during the first three years of their service in a proper Institute where they can receive on-the-job training and can work under a senior scientist. The Committee suggests that the policy already laid down by the ICAR regarding mobility, transfers and incentives for working in backward areas should be strictly followed and implemented.

SERVICE CONDITIONS

Pay Scales

7.34 The country benefits from the rich returns to agricultural development from agricultural research. This should be reflected in the salaries, promotional opportunities and service conditions in the Agricultural Research Service. Agricultural scientists should be treated fairly, and in any case not be treated less than those in other scientific organizations. The Central Government and the UGC have recently effected revisions in salary for the staff. The ICAR and SAUs have to work in close collaboration and require similar expertise and experience. It is recommended that the scales of pay of scientists in the ICAR at the entry and middle level (S-1 to S-3) should be at par with those recommended by the UGC for the Universities from the level of Assistant Professors through Readers to Professors.

Generous Terms of Superannuation

7.35 The solution to the problem of non-performance is not simple because we cannot expect our scientists to be immune to the usual pressures of the society. All the same, the Committee feels that it should be possible to provide at least a partial solution by offering those who have reached the end of their creative period, or age above 50 years, generous terms of superannuation to motivate them to move to other areas of endeavour.

Engagement of Scientists in Activities other than Research

7.36 Scientists should not ordinarily be engaged in activities other than research, education and extension. The ICAR has issued clear instructions in the matter. Sometimes it may become necessary to allot other work (administrative and supportive) to scientists, particularly in the early and developmental stages of an Institute or when there are not sufficient administrative or supportive staff due to delay in appointments and postings. In situations where this becomes necessary the scientists should feel that they are still contributing to the growth of the Institute and its programmes. Scientists allotted work such as wardens of hostels should be compensated suitably either by giving rent-free accommodation or honorarium. When scientists are compensated for extra work outside normal office hours, such work should not be considered for inclusion under official work. Where the scientists are not so compensated, such work done outside office hours should be given credit both in annual assessment and five-yearly assessment.

7.37 The Directors of all Institutes of the ICAR other than those declared deemed-to-be Universities or National Institutes should have the pay scale of grade S-5.

7.38 The Directors of the deemed-to-be Universities and the National Institutes and the Deputy Directors-General should have the scale of pay sanctioned for the Vice-Chancellors of the Universities.

CAREER PLANNING AND DEVELOPMENT

Promotional Avenues

7.39 For professional and career development, scientists should have adequate opportunities. It is recommended that there should be two channels/ladders for the scientists for advancement; one in the professional line where a scientist advances in his career based upon his work in his field of specialization, particularly for those who are not interested in research management positions, and the other in the ladder for those who are interested in research management such as planning and evaluation, co-ordination and administration of research. There should not be any difference either in rank or status of scientists holding positions at any particular level, say S-4, S-5, or S-6, either in research management positions or in the scientific positions. The committee recommends that this can be done by including all the positions from S-1 to S-6 under the ARS as suggested earlier and filling the research management positions by direct recruitment on a tenure basis without insisting on previous managerial experience.

Professional Training

7.40 Facilities for professional training for scientists either abroad or within the country should be adequate to improve their competence in the specialized areas of research as newer developments are taking place at a fast rate. Opportunities should be provided for scientists to update their knowledge and skills periodically by sending them for training in Institutes where advance research is in progress or where there are facilities for acquiring special skills. Each Institute should foresee its needs of training in critical areas so that when opportunities arise they are ready to use them. Each Institute should have a list of research institutes or organizations where the needed specialized training is available. Besides professional training, training in research management for all senior scientists and in research project management for all junior scientists should be given at the NAARM.

This will help the individual's development to maturity and also create a scientific culture and fraternity among the ICAR scientists. Training in administration and accounts should be covered in the training programmes. Appropriate training should also be arranged for the administrative staff to play their role efficiently in providing positive support to scientists in their work. This would help in bringing mutual understanding between the scientific and administrative staff leading to improvement in the working of the organization. We recommend that a schedule for these training programmes for various levels of scientists be developed in every Institute so that every scientist will undergo a training programme to upgrade his skills and knowledge at least once in five years.

Seminars, Symposia and Workshops

7.41 The Committee recommends that every scientist should be encouraged to attend the Seminars/Symposia in his area of specialization once in two years at least. This would enable the scientists to acquire new knowledge and skills and also foster interaction and cross-fertilization of ideas amongst them. Further, participation of scientists in International Conferences and Seminars should be encouraged, particularly whenever they are invited to present papers or give lectures in view of their expertise and standing in the field.

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Sabbatical Leave

7.42 Sabbatical leave is a period of freedom from routine duties given to academic and scientific staff to enable them to undertake special studies at some other institutions of their choice where they can gain experience which will promote their professional competence. This is leave with full salary and is counted as a period of their service. Scientists granted this leave should be free to avail of travel and other facilities that they can get from other sources. Persons should be eligible for this after completing six years of service. In the total service period, a scientist should have at least two such periods of sabbatical leave. This will be in addition to whatever other training programmes, delegations, etc., to which the individual may have been sent or permitted to attend by the organization. The duration of the sabbatical leave would be nine months to one year and can be availed of within or outside the country.

Leave for Acquiring Ph.D.

7.43 The ICAR has already provision for assisting the scientists in service to acquire Ph.D. It would be desirable that this training for Ph.D. is done at institutions other than the one where they are working. This should be made compulsory for completion of the course work, while the scientist may complete the requirement of research for Ph.D. in his institution as a part of his duties. For those periods for which the scientists have to go to other institutes for completion of the requirements for the degree, they should be given leave with pay up to three years, and this period should count towards their service. They should also be allowed to get fellowship over and above their salary.

TECHNICAL CATEGORY

7.44 Simultaneously with the introduction of the ARS, the ICAR also brought about a measure of reorganization for technical personnel. The grades of technical posts range from the lowest level of Rs 260-430 (pre-revised) to the highest level of Rs 1500-2000(pre-revised). The technical posts are grouped into three categories comprising the following grades.

Category	Grade			Pay Scale
Category-I	T-1	i)	Rs	260-430
	T-2	ii)	Rs	330-560
	T-3	iii)	Rs	425-700
Category-II	T-II-3	i)	Rs	425-700
	T-4	ii)	Rs	550-900
	T-5	iii)	Rs	650-1200
Category-III	T-6	i)	Rs	700-1300
	T-7	ii)	Rs	1100-1600
	T-8	iii)	Rs	1300-1700
	T-9	iv)	Rs	1500-2000

7.45 The personnel belonging to the technical category are also eligible for promotion on the basis of five-yearly assessment irrespective of vacancies. However, unlike the ARS, there is no common cadre for technical personnel, and the career advancement of the persons takes place in the respective Institutes or the Headquarters.

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7.46 The Committee would like to record that although technical personnel are not directly involved in research work, they are an integral part of the entire research process as they provide the requisite technical support, without which research cannot be accomplished. The Committee would also like to record that this category of personnel needs to be given all encouragement and support in their career advancement. Hence the Committee would like to recommend the following:

(a) A combined cadre of all technical posts at the Headquarters and Institutes be created for the grades of Rs 700-1300 and above (pre-revised), and positions in lower grades may continue to be borne on the strength of the respective Institutes or Headquarters.

(b) There should be a provision for promotion of technical personnel beyond the level of Rs 1500-2000 on the basis of special Selection Grade posts to be created beyond this level.

(c) In view of the technology advancement and development of more and more sophisticated laboratory and other equipment, the ICAR should evolve in-service training facilities for different levels of technical personnel to enable them to gain proficiency in the maintenance and use of such equipment.

(d) Wherever special allowances are admissible to scientists on their posting in difficult areas, the same level of financial assistance should also be provided to technical and other categories of personnel posted in these areas, if they belong to a combined cadre carrying the obligation for all-India transfer as a matter of routine.

ADMINISTRATIVE CATEGORY

7.47 At present, all administrative posts in the ICAR and its Institutes are organized into the following units:

(a) All posts at the Headquarters;

(b) All posts at the level of Lower Division Clerks to the level of Assistant Administrative Officers at the Institute; and

(c) A combined cadre for the Institutes for all posts of Administrative Officers to the posts of Chief Administrative Officers.

7.48 Due to its past linkages, the administrative set-up at the Headquarters is based on the pattern of the Central Secretariat, both in the matter of service conditions as well as the working procedures. In the Central Secretariat, however, because of its larger size, the staff have more avenues of advancement. In order to motivate the administrative staff of the ICAR for giving excellent administrative support to scientists and to become a part of the scientific culture, the Committee would like to recommend that these personnel may be given adequate opportunities for promotion to higher grades. To begin with, the Committee recommends that a few Selection Grade posts may be created at different levels to facilitate advancement of at least those personnel who might be stagnating in their existing grades. In the category of Stenographers, in particular, the chances of advancement are less than those in the normal administrative line. The Committee would, therefore, recommend that the Stenographers may be provided training in administrative and accounts procedures through short courses which may be specially designed and organized for this purpose. The Stenographers could then be considered for absorption in the administrative stream at appropriate levels on the basis of a certain fixed proportion.

7.49 In order to ensure recruitment of properly qualified administrative personnel, the Committee would also like to recommend that direct recruitment to administrative posts like those of the LDCs, Assistants, Stenographers, etc., should be made through the Staff Selection Commission, and to the posts of Section Officer through the UPSC.

7.50 The Committee has noted that at present there is little interaction or mobility between the administrative staff at the Headquarters and those working at the Institutes. As a result, a feeling has grown that the problems referred to by the Institutes to the Headquarters are not fully appreciated in a proper perspective. The Committee would, therefore, recommend that a scheme may be evolved by the ICAR whereby the administrative staff of the level of Section Officer and above at the ICAR Headquarters and Assistant Administrative Officer and above at the Institutes are exchanged on a systematic and regular basis.

7.51 The administrative staff have represented to the Committee that as for the other categories of personnel in the ICAR their age of retirement may be raised from 58 years to 60 years. The Committee understands that earlier the Sujan Singh Committee on administrative matters appointed by the Governing Body had not recommended the acceptance of this demand on the ground that this was not in line with the conditions of service applicable to similar staff in Government Departments. While this position is still true, there is at the same time a heavy stagnation of personnel in this category in the absence of adequate promotional avenues. In view of this, the Committee recommends that for administrative personnel also, which constitutes only a small percentage of the total staff strength of the ICAR, the age of retirement may be raised from 58 to 60 years. The Committee understands that the Central Schools Organization under the Ministry of Human Resources Development has prescribed the age of retirement for administrative staff at 60 years. Even in the ICAR the age of retirement of technical personnel has been raised from 58 to 60 years, although in most Government Departments, the age of retirement for this category of personnel is 58 years. A similar relaxation for the administrative category in the ICAR would not therefore involve any departure.

7.52 The Committee has noted that despite modernizing of office management in other organizations, the working of the administrative system as well as office equipment used by the ICAR continues to be outdated. The Committee would, therefore, like to emphasize the need for brining about a qualitative improvement in the manner of functioning of the administrative system by introducing modern equipment, like computers, electronic typewriters, etc. Also, the present system of staffing pattern and procedures in the administrative fields needs to be sufficiently modified consistent with the scientific culture of the organization. While detailed systems and procedures could be evolved by a team of management experts, as already indicated in Chapter 5, to begin with, the Committee would like to recommend the introduction of a Desk Officer system at the Headquarters with each desk comprising a Desk Officer or a Section Officer, one Assistant, one LDC and one Stenographer in place of the existing conventional sections. Similarly, the ICAR should introduce officer-oriented system with adequate provision for level-jumping to facilitate quicker decision making and expeditious disposal.

AUXILIARY CATEGORY

7.53 The personnel belonging to this category are not directly engaged in research and education activities of the ICAR. The posts in this category broadly include medical and para-medical staff, security personnel, staff employed in the Hindi Units, Public Relations, Publicity, etc. There are as many as 65 types of position in this category.

7.54 The posts in this category at the Institute and the Headquarters are of isolated character and hence it has not been possible for the ICAR to provide avenues of advancement for the staff. Thus, there is a feeling of dissatisfaction in this category of staff facing stagnation. Considering the isolated character of these posts, it has not been feasible to constitute any hierachical structure or to introduce any system of regular promotions. The ICAR has continued with this category as a separate segment without its absorption in the mainstream of the personnel system. For reasons of the morale of the personnel and the efficiency of the organization, this situation is not obviously a desirable one. The Committee, after very careful consideration, would like to recommend that this category of posts may be abolished and the respective posts may be merged in technical/administrative/supporting categories, depending upon the functions, scales of pay and qualifications prescribed for each of them. On their merger the personnel of this category would form a part of the respective categories for the purpose of career advancement and need to be tied up with one or the other posts for providing promotional avenues.

IMPLEMENTATION OF PERSONNEL POLICIES

7.55 The Committee in the earlier part of the section has emphasized three dimensions of the personnel policies, namely: (1) The effectiveness of the ICAR depends upon the quality and quantity of work done by its scientists. The system should adequately support the scientists through its technical, administrative and supporting services. (2) The manpower needed by the organization should be acquired and sustained through a system of recruitment of the best available talent in the country. The policies should provide for professional growth, provide reward to the scientists on the basis of their professional achievements, and manage the cadre of manpower in such a way that the total scientific manpower is able to meet the challenges of the emerging needs of agriculture which are getting highly diversified and changing rapidly. (3) The personnel policies should constitute a vital aspect of management in the ICAR system beginning with manpower planning, recruitment, continuous training and professional growth of the scientists. All this has to be operated as a chain of related activities, each one of it affecting the other and being affected by them. At present this seems to be disjointed instead of being integrated so that at every step the feedback and the required adjustments may not be possible. In view of the fact that this is an important area of professional management in sciences, the Committee is of the opinion that the DDG (Education) should be incharge of this activity. While the ASRB which belongs to the ICAR system will work independently for the purposes for which it has been set up, the DDG (Education) in addition to the present responsibilities, will function to provide feedback to the ASRB and articulate the work of the ASRB into the overall personnel management of the ICAR system. The present unit of the Director (Personnel) at the Headquarters will work under the DDG (Education). The

ICAR at its headquarters has till now been developing only in scientific areas, such as Crop Sciences, Animal Sciences, etc., which represent only a vertical line in the management of the organization. Too many such vertical lines dealing with subject areas are not conducive to the integrated management of the research organization. What is required now is a horizontal line of management activity getting across the disciplines. The management of personnel policies represents such a professional activity which should be headed by a scientist of repute. This will provide to the Research and Analysis Wing in the ASRB a large amount of data which will enable a better personnel management and even help develop newer procedures. The Committee emphasizes the urgency of this need so that an important sector of management at the Headquarters level is appropriately attended to.

PARTICIPATION OF SCIENTISTS IN JOINT CONSULTATIVE MACHINERY

7.56 It has been represented to us by a numer of scientists that under the present set-up there is no machinery for the scientists to seek redressal of their grievances of general nature. It was also brought to our notice that under the present system only non-gazetted employees of the ICAR are represented in the Joint Consultative Machinery. We feel that in order to enable the scientists to place their general grievances, the ICAR should create a body similar to that of the JCM for the scientists also.

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CHAPTER 8

LINKAGES OF ICAR WITH STATE AGRICULTURAL UNIVERSITIES

Role of the ICAR in Agricultural Education

8.1 An imminent need to bring about a rapid increase in agricultural production during the years following independence necessitated a complete overhauling of the education system in the country, including agricultural education. It was realized that the goal of increased production could be achieved only through the application of science and technology to agriculture and that an appropriately trained manpower is vital for developing science-based agriculture. With the introduction of the First Five-Year Plan in 1951 the requirement for agricultural and veterinary graduates for implementing various development programmes was large. With the pressure on trained manpower, the ICAR initiated several major steps for promoting agricultural education through assisting the State Governments in establishing new agriculture and veterinary colleges, increasing the capacity of the existing colleges, and also introducing post-graduate education programmes in selected ICAR Institutions.

8.2 In order to make education more pragmatic and practical-oriented to meet the needs of time, the technical support to agricultural education was also provided by the ICAR through developing uniform curricula for the B.Sc.(Ag.) and B.V.Sc. degrees prescribing the duration of the course, eligibility conditions, and the course content to be followed by the different agricultural and veterinary colleges in the country.

8.3 In the meantime, based on the recommendations of the First Education Commission (1949) headed by the late Dr S. Radhakrishnan, and the recommendations of the First and Second Indo-American Teams, the Government of India decided to establish Agricultural Universities in the country, and the first Agricultural University was set up in Uttar Pradesh in 1960. The ICAR was reorganized in 1966, when a full-fledged Division of Agricultural Education established at the Headquarters of the ICAR gave a major thrust to the agricultural education activities in the country. The Agricultural Universities established in each major State were provided with central assistance as well as technical support.

8.4 So far 26 Agricultural Universities have been established in the country and two Institutes under the ICAR system, namely the IARI, New Delhi, and the IVRI, Izatnagar, are conferred with status of deemed-to-be Universities.

8.5 The initial objective of the ICAR to establish one Agricultural University in each major State has been fulfilled. A proposal for the establishment of a Central Agricultural University for the North-Eastern Hills Region is under active consideration. At present, the Agricultural University system in the country provides education facilities in 11 fields of specialization at the under-graduate level and more than 50 disciplines at the post-graduate level. A brief summary of the number of institutions, number of students admitted, output, etc., under the Agricultural University system is given below:

Number of colleges, disciplines and their admission capacity under various programmes in State Agricultural Universities

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	Discipline	No. of Colleges	Admission capacity	
			Under-graduate	Post-graduate
1.	Agriculture	49	5450	2500*
2.	Veterinary Science and Animal Husbandry	25	1800	450
3.	Agricultural Engineering	12	560	200
4.	Home Science	11	670	115
5.	Fisheries Science	5	150	55
6.	Dairy Technology	6	160	200
7.	Agricultural Marketing, Banking and Co-operation	2	75	
8.	Forestry	6	180	12
9.	Horticulture	7	230	-
10.	Sericulture	1	30	-
11.	Food Science and Technology	1	50	-

* including Horticulture.

8.6 In addition there are 36 Agricultural Colleges admitting approximately 3,500 under-graduate and 600 post-graduate students, and affiliated to the Central and State Universities in the country.

Direct Involvement of the ICAR in Under-graduate and Post-graduate Education

8.7 The IARI, New Delhi, and the IVRI, Izatnagar, are pioneering Institutions which have contributed immensely to the higher agricultural and animal science education, respectively, even before the post-graduate education facilities were created in agricultural and veterinary colleges or universities in the country. They have now been conferred the status of deemed-to-be Universities also. In the area of dairy science, the National Dairy Research Institute, Karnal, started educational programmes as early as 1924. The Central Institute of Fisheries Education, Bombay, was the first to start organized instruction in fisheries science during 1961. Other ICAR Institutes also provide excellent facilities for post-graduate education and training.

8.8 The ICAR with the collaboration of the UNDP has been establishing Centres of Advanced Studies of Post-graduate Education and Research in selected disciplines in Agricultural Universities and the ICAR Institutes. So far 28 such centres have been established. Out of them, the following are located in the ICAR Institutes. These centres have become the nuclei for high-quality research and training in the concerned disciplines.

1. Dairy Production - NDRI, Karnal;
2. Poultry Production - IVRI, Izatnagar (now at CARI, Izatnagar)
3. Agricultural Economics - IARI, New Delhi;
4. Mariculture - CMFRI, Cochin;
5. Tropical Horticulture - IIHR, Bangalore;
6. Dairy Processing - NDRI, Karnal;
7. Plant Physiology - IARI, New Delhi;
8. Plant Virology - IARI, New Delhi;
9. Agricultural Statistics and Computer Applications - IASRI, New Delhi;
10. Plant Biotechnology - IARI, New Delhi;
11. Animal Production Biotechnology - NDRI, Karnal;
12. Immuno Biotechnology - IVRI, Izatnagar;
13. Agricultural Education and Research Management - NAARM,

Hyderabad;
14. Agro-Forestry - CSWCRTI, Dehra Dun;
15. Irrigation Management - CSSRI, Karnal;
16. Land Resources Management - NBSSLUP, Nagpur; and
17. Inland Fisheries - CIFA, Bhubaneswar.

8.9 The question of the direct involvement of the ICAR in the undergraduate education programme has been discussed at great length at various forums including the National Commission on Agriculture (1976). The Commission had recommended the discontinuation of the B.Sc. (Dairy Technology) programme at the NDRI, Karnal, and the recommendation has already been accepted by the ICAR. However, the programme is being continued since the SAUs have not developed the necessary infrastructure and facilities and are not yet ready to take up the responsibility. The Dairy Science College at the NDRI, Karnal, continues to be the best institution for imparting education in this discipline though more than half-a-dozen Dairy Science Colleges have been established in the SAUs. Since providing under-graduate education shall be the primary responsibility of the SAUs, the NDRI should taper off this responsibility within five years. The ICAR should assist the SAUs to develop the necessary capability in this area within this period.

8.10 The SAUs have, by mandate, the responsibility of under-graduate and post-graduate education in the concerned States. Many have developed physical and technical facilities and capabilities for providing post-graduate education in various fields of specialization. In the light of this, a suggestion that the ICAR Institutes should not be involved in educational activities has been made. Large resources in terms of scientific equipment, research facilities and trained manpower are available in the ICAR Institutes, which have a national mandate for applied and basic research in their areas of specialization and thus provide an ideal setting for combining post-graduate education with research. Further, the SAUs, being State-level institutions, have admission policies and faculty recruitment procedures which have become progressively restrictive to only people from their own States. It is our opinion that under-graduate education should not be undertaken by the ICAR and should be carried out by the SAUs. However, the ICAR Institutes should provide post-graduate education facilities restricting themselves to new and emerging areas such as biotechnology, genetic engineering, computer applications, environment education, energy management, etc. The ICAR should encourage the development of post-graduate educational facilities in the SAUs, and the ICAR Institutes should try to provide leadership. It may not always be possible to develop adequate teaching and research facilities in the SAUs for some subjects. Where such facilities exist in the ICAR Institutes, these should be fostered for post-graduate education and research. However, the ICAR Institutes should not regard themselves as competitors to the SAUs but as complementary, providing well-trained manpower in their areas of specializations and assisting the SAUs to build up their own faculty and research capabilities.

Regulatory Role of the ICAR to Maintain Quality

8.11 Since 1952 the ICAR has been exercising regulatory role on the quality of agricultural education in the country. The first step towards this effort was the development of the Indian Council of Agricultural Education incorporating the representatives of State Agricultural and Veterinary Colleges and the Departments of Agriculture and Animal Husbandry. This body closely monitored the progress of agricultural education in the country and gave guidance for its uniform growth. It was responsible for development of a model syllabus for Agricultural and Veterinary Sciences for B.Sc. and B.V.Sc. courses. It also framed guidelines giving detailed requirements for the establishment of new Colleges/Agricultural Universities in the country. Later, after the first reorganization of the ICAR, a Standing Committee of Agricultural Education supported by Scientific Panels on agricultural education, animal science education and home science education was set up. Through these expert bodies the ICAR has been playing a major role in providing technical support to agricultural education in the country. In spite of these efforts, a wide variation in the educational programmes of different State institutions exists. The standards of education differ from University to University due to variations in admission requirements, course contents, evaluation methods and standards, quality of scientific training of staff, etc. The SAUs also follow restrictive policy in admission and recruitment of staff, resulting in lack of mobility of students and staff between the Universities and Institutions. Further, since agricultural education is a "State subject" and the Universities are "autonomous" institutions, new colleges and programmes are started without adequate exercise on the manpower requirement, and later the ICAR's financial support is sought, deviating from the priorities set up during the beginning of each plan period. Such actions not only affect the planned programmes of the ICAR but also affect the quality of education in the SAUs.

8.12 Though the country has been brought under the National Agricultural System, a large number of colleges still exist outside the SAUs, functioning as affiliated colleges to the General Universities. These institutions are responsible for producing about 40% of the total agricultural graduates every year. Many of them are underemployed or unemployed due to the poor quality of their education. There is very little that the ICAR can do under these circumstances either in regulating the mushroom growth of institutions or programmes or in enforcing minimum standards of education.

8.13 The Committee learns that a large number of graduates and post-graduates in Agriculture have acquired their degrees from one University and are also employed by the same University. This has led to a tremendous amount of intellectual inbreeding. In the view of the Committee, this should be avoided. The Committee, therefore, recommends that the SAUs should encourage their students and teachers to obtain at least one of the degrees from other Agricultural Universities. The SAUs may also reserve 25% of the seats in post-graduate programmes for candidates from outside the State. The ICAR should also encourage the candidates to obtain a post-graduate degree from a University other than the one where a candidate had obtained the under-graduate degree or the post-graduate degree.

8.14 The Committee expresses serious concern on poor standard of education in Agriculture, more particularly in the Agricultural Colleges which are not constituents of the SAUs. Both the UGC and the ICAR should do a critical study of agricultural education in such colleges. As already recommended in Chapter 5, the ICAR may constitute a small task-force with the UGC to look into the problems of poor standards of education in these Agricultural Colleges and advise them on improving their standards of education. The UGC and the ICAR should sign a proper Memorandum of Understanding to help the ICAR to discharge its role in agricultural education. The Norms and Accreditation Committee should be reconstituted in the light of the earlier experience and be provided with suitable authority for determining and maintaining the standards of agricultural education.

Leadership Role of the ICAR in Faculty-Upgradation Programmes for Teachers in Agricultural Universities

8.15 Faculty upgradation was one of the activities of the ICAR since 1950. The scheme of organizing Summer Institutes was started in 1966 with a view to providing an opportunity for the teachers and scientists in updating their knowledge and exposing them to the latest developments in the fields of their specialization. These Summer Institutes also provide a common forum for the scientists of various disciplines to meet and discuss new developments in each area. Special fellowship programmes were also started by the ICAR to provide incentives to the teachers of the SAUs to improve their competence. Towards this purpose, provision has been made in the IARI, New Delhi, and the IVRI, Izatnagar, for admission of faculty members of the SAUs for Ph.D. programmes. The ICAR also has a scheme supporting the participation of the SAUs in International Symposia, Conferences, etc.

8.16 Teachers' training has been a weak link in the agricultural education system from its inception. It was generally felt that scientists with post-graduate qualifications do not require special training in teaching techniques. It has been realized only lately that training of teachers on educational technology and methods is important for higher education also. Recently, the ICAR has established an "Advanced Centre for Educational Technology and Research Management" at the NAARM, Hyderabad, with UNDP assistance. Taking into consideration the large number of teachers to be trained, it is realized that the Centre at the NAARM would be inadequate to train all University teachers. However, the Educational Technology Centre at the NAARM should provide leadership in this field and organize "training to the trainers".

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8.17 Further, specialized Institutes of the ICAR have a rich resource of infrastructure, facilities and trained manpower. Such Institutes can make a very important contribution by offering, on their own, non-degree training of specialized nature and may provide research facilities for post-graduate education to students registered with the SAUs in the region. Further, scientists and teachers from the SAUs could also utilize the research facilities of the Central Institutes through developing co-operative research programmes. Interchange of staff between the SAUs and the ICAR should be encouraged, and specific financial support, if any, for this activity should be reflected in the Plan funds of the ICAR.

8.18 The SAUs, Central Universities having Agricultural Colleges and even some of the ICAR Institutes face shortage of manpower particularly in the emerging areas of research like Biotechnology. To overcome this handicap, the ICAR should send Review Teams to visit these Institutes and

Universities, identify weaker areas, and provide Professors and Senior Scientists from other SAUs and ICAR Institutes. These Institutes and Universities should also be supported with adequate finances to utilize the services of Professors and Senior Scientists placed with them.

FUND ALLOCATION

8.19 Until the later part of the Third Plan, agricultural education received little financial assistance from either the UGC or the Ministry of Agriculture. During the sixties some provision was made for giving financial assistance to SAUs and Colleges. After the reorganization of the ICAR in 1966 and the establishment of the Agricultural Education Division at the Headquarters of the ICAR, concerted efforts were made towards the development of agricultural education systematically. The budget allocation for the scheme since then has increased considerably. The financial investment made by the ICAR towards the establishment and development of the SAUs has been steadily increasing from 1.2 crores in the Third Plan to 53.2 crores in the Sixth Plan, though it has dropped to 36.6 crores in the Seventh Plan.

8.20 Central assistance to each SAU during the Plan periods varied from 2 to 3 crores per single University in a State, 2 to 2.50 crores in case of two Universities per State, and 1 to 1.5 crores per University where more than two Universities have been established in a State.

8.21 The criteria for determining the quantum of assistance to each SAU has been discussed at various forums. Several possible yardsticks such as population, cultivable area, irrigated area, total production, number of farm families, production potential, etc., have been suggested. But no consensus could emerge. Since the number of States having more than one Agricultural University has increased, there is an imminent need for evolving acceptable criteria. In our opinion, the level of development and professional potential of the University, cultivated land area, population and number of farm families in the area of responsibility of the University, the number of campuses and the number of students would be acceptable criteria. The primary objective of establishing at least one Agricultural University in each major State has now been fulfilled. Establishment and development of additional Universities should be the responsibility of the States concerned. Instead, the ICAR should divert its attention to developing Centres of Excellence in emerging areas of importance to improve the quality of education and research in the universities.

MODEL ACT OF AGRICULTURAL UNIVERSITIES

8.22 After the first Agricultural University was established in 1960, with a view to providing a model legal basis to Agricultural Universities system in the country, the Government of India appointed an Agricultural Universities Committee in 1960. This Committee submitted its report in 1962 which provided the guidelines for developing Model Act by the ICAR. This Model Act given out in 1966 provided sufficient details regarding legal framework in the development of Agricultural Universities in India. In developing the Act, the concept was a mono-campus institution within a uniform administrative and supporting system with a cluster of institutions. Unfortunately, this Act was not fully implemented in many of the SAUs. Based on the recommendations of the Agricultural Universities Review Committee in 1977, the ICAR took various steps to persuade the State Governments to adopt the provisions of the Act. These efforts did succeed to a great extent in bringing out uniformity in the Acts of most of the SAUs. During this period, the academic and political systems have also changed considerably.

8.23 There is a need for co-ordination among the Agricultural Universities located in the same State. The States should appoint suitable co-ordinating committees comprising the Vice-Chancellors of the SAUs under the Chairmanship of an eminent agricultural scientist. Such a Committee should ensure delineation of educational and research responsibilities of each of the Universities within the State and ensure that unnecessary duplication is avoided.

MOBILITY OF SCIENTISTS BETWEEN THE ICAR AND AGRICULTURAL UNIVERSITIES

8.24 In the National Agricultural Research System, the ICAR and the SAUs should be considered as the two sides of the same coin. As such, they should complement each other in their activities including encouraging the mobility of their staff. The disparities in the pay scales and service conditions of their staff, however, happen to be one of the disincentives for such movement. To encourage such movement, we are strongly of the opinion that the following steps will be useful.

1. Each organization should be free to take from the other, with the consent of the parent organization, scientists on deputation for a fixed

tenure without in any way affecting their career-advancement opportunities or service conditions.

2. A scientist's deputation to another organization should be accorded a higher weightage in his/her performance ratings for the purpose of promotions.

3. At least 5% of the scientists of the ICAR should be encouraged to go on deputation every year.

4. Sufficient incentives should be available through introduction of proper schemes to support the scientists to move over from one organization to the other as visiting professors, on sabbatical leave, etc., and through provision of fellowships for young scientists.

5. The period of deputation should be considered as duty and the scientist should be entitled to all benefits thereof, e.g. retention of residential quarters, counting of service, accrual of increments, etc.

6. Honorarium at 20% of salary should be paid by the ICAR in addition to the deputation salary drawn from the host organization.

7. Transfer, TA and DA should be paid on actual basis by the ICAR.

8. Additional earned leave at 1/6th of the period spent on deputation should be allowed subject to a ceiling of one month.

9. There should be provision for transfer of pension and other benefits to the scientists involved so that they are not financially affected by such transfers.

10. Mobility of scientists between the ICAR Institutes and SAUs may be made through collaborative research programmes, utilizing the expertise and facilities available with them.

IMPROVEMENT OF ACADEMIC DISCIPLINE IN THE SAUs

8.25 To improve academic discipline, the Committee is strongly of the opinion that the following steps should be taken.

1. Rotation of Deans and Heads of Departments in the University has created a lot of uncertainty and indiscipline. It is recommended that the Deans and Heads of Departments should be appointed on tenure basis after due selection by the University. The term of the Deans or Heads of the Departments may be five years. He or she may be eligible for reappointment for a second term again but only on the basis of selection. There should be no appointment for the third term.

2. In some of the SAUs basic science colleges are not sufficiently strong or do not exist at all. The development of basic sciences is essential to improve agriculture and other allied sciences. The Committee recom-

mends that basic science faculty should be created where it is not existing. Introduction of disciplines, like biochemistry, microbiology, genetics, mathematics, statistics, etc., is now essential to modernize agricultural education.

3. Greater emphasis should be laid on practical training both in the laboratory and farm. Clinical practice for veterinary students should be an important integral part of the training.

ASSISTANCE TO GENERAL UNIVERSITIES

8.26 Since a number of general universities have excellent facilities of basic sciences related to agriculture, the Committee recommends that the ICAR should utilize the facilities available in these Universities in research basic to agriculture through its co-ordinated research projects, AP Cess funded projects and through Plan funds, wherever, considered necessary.

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CHAPTER 9

TRANSFER OF TECHNOLOGY

9.1 The present rate of agricultural production could be doubled if the available technologies are brought to bear with the production processes and programmes thus focusing more and more on transferring our new technologies from laboratories and research institutes to the farmers. This has been amply demonstrated through the National Demonstrations on major cereal crops. A big gap exists between the yield level achieved and achievable. It has been estimated that only about 30% of the technologies available are being used by the farmers. This calls for strengthning of the transfer-of- technology programmes.

9.2 The demands made upon the transfer of technology for accelerating agricultural production are enormous. There are four major organizational streams devoted to extension work for agricultural and allied production: (1) the ICAR extension system comprising the Research Institute and the SAUs, (2) extension system of the Ministry of Agriculture and the State Departments of Agriculture, (3) extension system of the Ministry of Rural Development and State Development Department, and (4) development work by voluntary private organizations, business houses, etc.

9.3 At present the extension system deals with about 81.5 million land holdings and about 500 million rural people, farm women, farmers and agriculture labourers. An extension system, however vast, cannot reach them quickly. Hence the extension agencies, training institutions and input organizations should develop and maintain a strong functional relationship and play complementary and supplementary roles influencing the total agricultural production in the country.

TRANSFER OF TECHNOLOGY IN THE ICAR SYSTEM

9.4 When the ICAR was reorganized in 1966, an Extension Education unit was established at the Headquarters to promote the transfer of agricultural technologies. The National Demonstrations Scheme, which was implemented by the Department of Agriculture and Cooperation, was transferred to the ICAR since the scientists who generated the technologies could be in a better position to demonstrate their maximum potentials on the farmers' fields. Since the task is massive and the latest technologies are not reaching the farmers and the extension agencies at a rapid pace, the ICAR created the Division of Agricultural Extension at the headquarters and Zonal Co-ordination units for decentralized monitoring of the projects. The Transfer-of-Technology(TOT) projects of the ICAR are being implemented by the SAUs, ICAR Research Institutes and a few reputed non-Government organizations.

9.5 The first-line extension system of the ICAR basically plays an institutional extension role, a catalytic role, a supportive or complementary role as well as a pressure role to accelerate the process of TOT. It serves as a window through which the extension agencies and the farmers can gaze at the latest agriculture technologies. In specific terms, its objectives are:

1. To promptly demonstrate the latest agricultural technologies to the farmers as well as the extension workers of the State Departments of Agriculture and non-Government organizations with a view to reducing the time-lag between technology generation and its adoption;
2. To test and verify the technologies in the socio-economic conditions of the farmers and identify the constraints;
3. To get a first-hand feedback of farming problems so that scientists can reorient their research, education and training programmes;
4. To provide training and communication support to the state Departments of Agriculture and non-Government organizations; and
5. To promote extension research and studies, including comparative studies of extension system in different parts of the world.

9.6 At present, the ICAR spends only 7.2% of its Plan budget(not total budget) on TOT projects. Thus the involvement of the ICAR in TOT is very modest. With the support of the ICAR, the SAUs spend from 0.5% (Marathwada Agricultural University, Parbhani) to 16% (Gujarat Agriculture University) of their budgets on TOT. So far the involvement of the ICAR Institutes in extension activities has been very limited with the exception of the IARI (New Delhi), NDRI (Karnal), and IVRI (Izatnagar). While the SAU has area jurisdiction for the state or region as a whole, the functioning of the ICAR Institute and their centres has been limited to the district or the limited area in which they are located.

9.7 There are four main TOT Projects of the ICAR, namely the National Demonsration Project(NDP), Operational Research Projects(ORPs), Krishi Vigyan Kendras (KVKs) and Trainers' Training Centres (TTCs), and the Lab-to-Land Projects and the Roving Extension Advisors. All these projects are of mobile type except the KVKs, which are vocational training institutions. The projects are shifted every five to six years from one location to another in the larger interest of the farming communities and the extension workers of the areas.

9.8 The National Demonstrations Project is devoted to (1) demonstrate the genetic production potential of the major food crops in the field conditions, and (2) develop the farmers into local leaders to serve as agents of change in their areas. The NDPs are at present implemented in 48 districts, mainly through the SAUs(except where no SAU is located), and are shifted to other districts after six years. The farmers under the NDP are changed every two years. About 100 demonstrations are conducted annually by four subject-matter specialists in each district.

9.9 This is the only project in the country where field-based data on production performance are available. They are being used by both Government and non-Government agencies for developing crop-production strategies.

9.10 The National Demonstrations so far have been limited to food crops only; this project may be extended to other subject-matter areas like horticulture, livestock production, etc. The regional imbalances may also be corrected by adding some more NDPs. The subsidy towards cost of inputs should also be enhanced.

9.11 The Operational Research Projects(ORPs) were launched in 1972. The objectives of the projects are to (1) introduce technologies as action, and evolve appropriate cropping patterns, (2) educate and train the farmers on the adoption of technologies, (3) identify constraints and farming problems, and (4) evoke community participation. There are three types of ORPs: (a) Watershed Resources Development in dryland areas, (b) problem-oriented ORPs(intergrated pest management in rice, etc.) and (c) audience-oriented ORPs (Scheduled Caste and Scheduled Tribes Projects). The Watershed Resources Development ORPs are being implemented by the CRIDA (Hyderabad) and the CSWCRTI (Dehra Dun) in collaboration with the Department of Agriculture and Co-operation and the Department of Rural Development of the Ministry of Agriculture. The other projects are mainly implemented by the SAUs, ICAR Research Institutes and Selected non-Government Organizations.

9.12 The ORP concept and objectives are no doubt difficult, and orient-ing and training manpower in this respect should be an important task. Transfer and withdrawal of staff after such training must not be done in the interest of the projects. Sufficient contingencies to demonstrate the alternative farming systems are not readily available. They must be augmented. The projects also require long-term continued efforts, at least for ten years, to show the total results and also prepare the farming communities and villagers to continue with the development efforts. Co-ordination and linkage with State Departments needed enforcement. The development of hilly areas in the watershed has created forest wealth in the form of grass, fodder plants and fuel trees, and the sharing of the wealth between the State Governments and the village Resources Development Societies should be promoted as a policy direction. More ORPs in strategic areas may be launched for which additional resources would be needed under the Plan schemes.

9.13 The Krishi Vigyan Kendra (KVKs) and the Trainers' Training Centres (TTCs) were established on the recommendation of the Education Commission (1964-66) which suggested the creation of agricultural polytechnics to provide practical education and training to post-matriculates . The basic aim was to improve the technical literacy of the vast majority of the illiterate farmers, farm women, young farmers, school drop-outs and field-level extension functionaries. Unlike the Farmers' Training Centres, the KVKs are multi-disciplinary and integrated in their approach in training the farmers and extension workers. The subjects covered are annual crops, horticulture, animal husbandry and dairying, fisheries, forestry, home economics, post-harvest technology, etc.

9.14 While finalizing the KVK design, it was also envisaged that the KVK teachers have to be practical and well versed in the technology as well as training pedagogy. Therefore Trainers' Training Centers (TTCs) were established at specialized Institutes. There are 8 TTCs in specialized areas like dryland agriculture(CRIDA, Hyderabad), horticulture(IIHR, Bangalore), dairying (NDRI, Karnal) and the like. The TTCs are training the KVK teachers and the in-service staff of the State Departments of Agriculture, other institutions and agencies. So far 89 KVKs and 8 TTCs have been established in the country. They are at different stages of development depending upon the facilities they inherited from the host institutions and the resources made available from the project.

9.15 The committee strongly recommends that sufficient funds be allocated to establish one KVK in each district of the country within a 10-year time frame.

9.16 While the total burden of establishing over 400 KVKs and TTCs and funding them by the ICAR may not be feasible, the continued leadership, guidance and monitoring of this vital project by the ICAR in collaboration with the State Government will be imperative.

9.17 In the long-term interest of this project and the farming community, the committee recommends strongly the pattern of funding as under:

1. 100% by the ICAR for the first five years;
2. 50:50% by the ICAR and State Governments for another five years; and
3. 25:75% by the ICAR and the State Government after ten years on a continuous basis.

9.18 In 1960s Farmers Training Centres (FTCs) were sponsored by the Ministry of Agriculture, Government of India, and later transferred to the State Governments. With a few exceptions, the FTCs do not have farms, equipments, buildings and other practical facilities for skill-oriented training. The training is mostly confined to crop production and the staff are mostly graduates in agriculture. Their number in the States have been already reduced and several of them are not functioning properly. Since the ICAR and the State Governments are going to be partners in establishing and monitoring the schemes on KVKs, it will be in fitness of things that wherever possible the FTCs are converted into KVKs. This will improve the quality of training and will also be economical in that the existing resources of the FTCs could be utilized.

9.19 The Lab-to-Land Project (LLP) was launched by the ICAR in 1979 to extend and promote new technologies among the small and marginal farmers and agricultural labourers and also test the relevance of the technologies in their socio-economic conditions. Since this project does not have any staff component it is implemented by the existing institutions and staff. This programme brings the scientists in close interaction with the farmers and gives them first-hand feedback to reorient research priorities to suit farmers' needs.

9.20 The Lab-to-Land Project was started in 1979 with 50,000 families of small and marginal farmers and agricultural labourers. In 1982-84,the number of families was increased to 75,000, for the programme became very popular and its usefulness to poor and weaker farmers was established. However,during the Seventh Plan period (1985-89) the families adopted under the programme have been reduced to 18,000 due to financial constraints. Two sub-projects called "Land-to-Lab" and the "Roving Extension Advisors" as a part of the lab-to-land project have also been started during Seventh Plan to strengthen the feedback mechanism and external assessment.

9.21 Considering its usefulness, it is recommended that the lab-to-land programme may be initially restored to its normal strength that is adoption of 75,000 families of small and marginal farmers and agricultural labourers by the research and educational institutions.

Role of the ICAR Institutes and Agricultural Universities

9.22 Since the establishment of the SAUs, the pattern of intergrated working of teaching, research and extension education is being practised systematically and vigorously. This system gave prompt dividend in ushering in the Green Revolution in the country. The first-line extension education role was accepted by the SAUs and the general extension role was left to the Ministry of Agriculture and the State Departments of Agriculture. A closer linkage between the two systems will be in the larger interest of accelerating agricultural production in the country.

9.23 The SAUs have state-level area jurisdiction for the extension education work and a full-fledged Directorate of Extension exists in each university. However, the Directorates of Extension Education in some of the SAUs are not strong and hence their activities and contributions are limited. The Directorates of Extension Education of the SAUs must be strengthened adequately both by the ICAR as well as by the respective State Departments of Agriculture by providing adequate financial support and guidance.

9.24 The Committee feels that the pattern of extension structure of the PAU (Ludhiana) and the HAU (Hisar) are commendable in many respects. To strengthen the linkage with the State Departments of Agriculture and work hand in hand, they have subject-matter specialists at the district level. The PAU calls it Farm Advisory Service Centres and the HAU calls it Krishi Gyan Kendras (KGKs). This approach of having Farm Advisory Service Centres at the district level may be promoted in all the States and the ICAR may provide initial development grants for this.

9.25 The ICAR Institutes do not have area responsibility like the SAUs. The out-reach extension activities of the Institutes or their sub-centres may be limited to their respective districts and the programme may be implemented in full co-operation of the respective State Departments of Agriculture as well as the SAUs. The ICAR Institutes TOT Departments as well as TOT Projects must earmark separate and adequate budget as part of the Institute's budget. There should be an integrated system of delivering the extension material to the farmers. SAUs, ICAR Institutes and the State Development Departments should have co-ordinating mechanism so that a single set of recommendations reach the farmers.

9.26 The communication centres of the SAUs are not fully equipped with all the required gadgets. Support to this effect has been very limited. On the model of the GBPUAT, Pantnagar, the communication centres may be developed to include press, photo-labs, and recording studios for radio and television programmes.

9.27 Pre-release materials and seeds are tested in field conditions through the State machinery as well as in the co-ordinated field trials. The first-line TOT projects may also be suitably associated with this programme. Such linkages with the KVKs having adequate scientific and farm facilities will be especially rewarding in terms of getting quality data and feedback.

9.28 The committee feels that research in extension mechanism and methodology are lacking in all Institutions and the SAUs.

9.29 Research in transfer of technology, especially dealing with the socio-economic implications of modernization in agriculture, may also be promoted through all-India co-ordinated mechanism or supporting the institutional projects. Action research and on-farm research approach could give qualitative information.

9.30 The Division of Transfer of Technology of the ICAR may be made responsible and fully accountable for monitoring the first-line projects and development grants of the ICAR to the SAUs and others.

LINKAGE BETWEEN RESEARCH AND DEVELOPMENT SYSTEMS

9.31 Linkage between the research and development system is imperative for accelerating agricultural production. All the TOT projects of the ICAR have a built-in design for co-ordination at the local, district, state and the central levels. However, the co-ordination mechanism must function more regularly and effectively. Co-ordination is a two-way process and the concerned parties must put forth equal efforts from both the sides for achieving integrated working.

9.32 At the centre, a co-ordination committee on Research and Development is functioning under the Chairmanship of the Director-General of the ICAR where senior officers of the ICAR and the Department of Agriculture and Co-operation are represented. This Committee meets once in a month or more frequently, depending upon the needs and the emerging issues. Meetings of each of the eight Regional Committees are held once a year in which the ICAR, its Institutes, the SAUs and State Departments of Agriculture meet and interact, highlighting the problems for further attention by the national agricultural research and education system. A more active participation of the respective State Department of Agriculture will help in improving the TOT programme.

9.33 At the State level, all the TOT projects are annually reviewed under the Chairmanship of the Vice-Chancellors, and tne officers of the State Departments of Agriculture are invited to these annual review meetings. An active participation by the State Development Departments is essential in all such state-level projects. District level, and local co-ordination and management committees also must be revitalized for regular and closer interactions.

9.34 On the introduction of the Training and Visit (T&V) extension approach by the Ministry of Agriculture in States, the demand for linkages with research system has been more felt and pronounced. The monthly workship of the subject-matter specialist and the fortnightly training of the village extension workers provide good opportunities for interaction between the two systems and feedback. The T&V programme should be expanded to cover the entire country and also all the areas of agricultural productivity, including horticulture, animal husbandry, fisheries, etc. The Joint Zonal Advisory Committee meetings being organized by the State Departments of Agriculture are also proving useful for R&D linkages. Both the systems must come more closer functionally and attempt to help each other to create a synergistic effect on accelerating agricultural production in the country. The co-ordination mechanism both at the centre and the states should provide forums for deciding research priorities as well as recommendations of technologies and package of practices for the field extension work.

MOTIVATION OF EXTENSION WORKERS AND SCIENTISTS

9.35 It is generally felt that the scientists involved in extension activities do not get proper recognition and promotion avenues due to lack of opportunities to do research and publish papers. This is mainly due to their nature of work. The system for evaluation of extension scientists for selection, promotions and other awards should change, and published papers and other academic achievements may not be the main criteria of assessment. At the same time it is necessary that the scientists involved in such activities should document their work fully. The ICAR may also consider institution of a few awards for the extension scientists, extension workers and progressive farmers.

ICAR LINKAGES WITH THE MINISTRY OF AGRICULTURE

9.36 Although a Co-ordination Committee for Research and Extension has recently been set up to discuss the matters related to ICAR support to agriculture development, there is a need for greater strengthening of linkages between the ICAR and the Ministry of Agriculutre. The ICAR should function as a technical arm of the Ministry of Agriculture . The Ministry of Agriculture should draw more freely from the personnel resources of the ICAR and the SAUs for their senior technical positions.

9.37 There should be a small and compact co-ordination Committee comprising the Director-General, ICAR, Secretary (Agriculture), Agricultural Commissioner, Animal Husbandry Commissioner, senior officers of the level of DDGs from the ICAR and Advisor (Agriculutre), Planning Commission. It should meet periodically with well-thought-of agenda, and the agenda notes should be circulated in time to all Members. The Ministry of Agriculture in such meetings should indicate problem of development, and the research and extension support required by the Central and State Departments of Agriculture from the ICAR and the SAUs. The ICAR may keep the Ministry of Agriculture informed of the research work being carried out and the major findings as well as the work on transfer of technology involving farmers' fields and herds.

9.38 The Committee may be serviced by an Additional Secretary in the Ministry of Agriculture or a senior Deputy Director-General in the ICAR.

9.39 The representatives of the Ministry of Agriculture should attend the ICAR Regional Committee meetings and may also be invited in the technical conferences and workshops organized by the ICAR.

CHAPTER 10

RESEARCH PLANNING, IMPLEMENTATION, MONITORING AND EVALUATION

10.1 The agriculture scenario all over the world is undergoing a rapid change from the level of subsistence agriculture to meet the food, fuel and fibre needs of the farmer and his immediate family to a business proposition influenced by the fast changing agro-technology and internal and external market forces. The National Agricultural Research Systems around the world have become sensitive to the change and have reoriented the priorities in research to meet these changing demands.

10.2 Since the production of foodgrain in the country was very critical, the initial efforts of the ICAR were to focus attention on research for the improvement of cereal crops (rice, wheat, maize, sorghum, pearlmillet). This paid very rich dividends. It not only relieved the country from foodgrain import, but also helped to build up a national food reserve of 27 million tonnes(at one point of time). In addition, the breakthrough in production of cotton, sugarcane, potato, apple, milk, eggs and broiler and a few other commodities was also achieved . India can take credit for introducing hybrid cotton in the world. The technologies developed by researches in soil, water, fertilizer management and soil reclamation and their impact on production is noteworthy. Green revolution ushered in a new scientific era in independent India and gave agricultural science respectability and achievement consciousness. As it happens in any developmental process, the easier problems have been solved and the more difficult ones remain to be tackled. A criticism has been voiced that the increase is more from the elite sections of farmers and irrigated areas and that the rainfed and dryfarming areas, and resource-poor farmers did not benefit to any appreciable extent by this green revolution. There is evidence of regional imbalances and a serious problem of shortages of pulses and oilseeds. This situation has brought forth the urgent need for the ICAR to take a long-range forward look on the future needs of research, and for identifying priorities in respect of research of national and regional relevance and importance. Moreover, increasing population pressure of human and animals, shrinking land resources and increasing problems of soil, water and environmental degradation call for increasing productivity per unit land per unit time and improving sustainability of agriculture without detriment to the environment. A more dynamic and improved technology is needed to provide adequate food, fibre and fuel to the fast increasing population which will touch a 1,000 million mark by the end of this century. There is a constant struggle against poverty and malnutrition in a predominantly agricultural country. Science and technology has to free Indian agriculture from fluctuations of weather and natural hazards.

10.3 After the reorganization of the ICAR in 1966, when all central Agriculture Research Institutes were transferred to the ICAR and agricultural education was brought under its purview, the research efforts of the ICAR were cast on national canvas and are carried out, on a country-wide basis in a co-ordinated multidisciplinary way. This thinking resulted in the conceptualization, formulation and implementation of a number of All-India Co-ordinated Crop Improvement Projects in which the ICAR Institutes and the SAUs fully and actively co-operated.

10.4 Agriculture being a State subject, the primary responsibility for agricultural research should normally rest entirely with the SAUs. Over the years, the establishment of the SAUs, which now total 26 in number, have altered the position with regard to the physical resources and infrastructure available for agricultural research in states. Many of these Universities have now become strong in terms of appropriately trained manpower and adequate physical and financial infrastructure needed for good-quality agricultural research and education. They are now in a position to shoulder the responsibility for research, education and extension education in their respective states and conduct research of relevance to the agro-ecological regions. It has, however, to be recognized that all the SAUs have not as yet developed uniformly well and there are still regions in the country where adequate manpower development and establishment of research facilities are not satisfactory, e.g. the states and Union Territories in North-Eastern India, Ladakh and Andaman and Nicobar islands, etc. Being ecospecific, agriculture research often does transcend the State boundaries when similar agro-ecological situations exist. This makes inter-state co-operation in research not only desirable but necessary.

10.5 The role of the ICAR under this altered set of circumstances needs to be redefined. The relevance of several centrally sponsored programmes should be reassessed and structural reorganization made so as to meet the needs of location-specific and regional research. The existing programmes of research need to be critically evaluated, priorities indicated and the role of the ICAR institutes vis-a-vis agricultural universities delineated. Also, there is a need for setting up a national mechanism for monitoring and evaluating the on-going research projects and for forward planning to meet future research needs. This would make the National Agricultural Research System more effective and productive.

PRIORITY THRUST AREAS FOR RESEARCH AT THE NATIONAL LEVEL

10.6 In crop and resource-management research, the ICAR should consider the following thrusts for drawing up research agenda and policies for the future.

1. *Increasing productivity and efficiency of irrigated farming through greater emphasis on research on soil and water management*: India has invested heavily on the development of irrigation over the last three decades, but the production of foodgrains per hectare per year from these irrigated areas is miserably low, hardly 1/5 to 1/4 of the potential; thus the focus on research in increasing crop productivity and cropping intensity in the different irrigation command areas assumes first priority. If an emphasis is laid on research on soil and water management and constraints to production in irrigated areas are removed, it is possible to maximize crop productivity and minimize soil degradation, primarily with labour-intensive methods.
2. *Rainfed farming and dryland technology:* Despite all the efforts for exploiting irrigation potential, more than half the cultivated area in India will be dependent on rainfed farming and dryland technology. Dryland agriculture will determine the stability and sustainability of agriculture in the country and the ICAR should deploy its resources and technical might to achieve this goal taking into account the socio-economic constraints of the areas. Serious efforts should be made to ensure doubling of the production from the rainfed agriculture.
3. *Improving efficiency of inputs in agriculture:* Whether it is irrigated or rainfed agriculture, the use of costly agricultural inputs such as fertilizers, pesticides and energy becomes essential. Improving the effciency of the use of water both in irrigated and rainfed farming is equally important. Highest priority should be given to research on improvement of efficiency of these inputs. The economics of farming will be dependent on these.
4. *Breaking yield barriers of wheat and rice and increasing productivity and stability of yields of pulses, oilseeds and* rabi *sorghum:* Special attention should be given to research on *rabi* sorghum, groundnut, rapeseed, chickpea and pigeonpea and breaking the yield barrier in wheat

and rice which have reached a plateau. The productivity, stability, efficiency and economics of cultivation of these crops must improve.

5. *Concern of fuel and fodder:* Research should be intensified on agro-forestry and silvi-pastural, and agro - horticultural systems to solve the fuel and fodder problem, and improve the productivity and sustainabitliy of agriculture.

6. *Fighting drought and nutritional stresses*: Drought and plant nutrient deficiency are the most serious abiotic factors reducing crop yields. Special research efforts are needed to manage these stresses for improving the stability of production.

7. *Management of biotic stresses:* Diseases and pests are great yield-reducers and their management calls for special research thrust. Thus research for judicious, economic and safe use of pesticides, biological control of pests, use of pesticides of plant origin, incorporation of multiple genetic resistance to pests and diseases by systematically pyramiding resistance genes in improved crop varieties is essential.

8. *Processing and marketing:* Reduction of losses inflicted by pests in storage of agricultural produce and development of technology for adding value and enhancing storability and marketability of products should receive adequate attention.

9. *Recognizing the importance of genetic resources:* Intensive efforts should be made to increase the germplasm collection, maintenance, evaluation and utilization for the benefit of agriculture of today and the future by working with the SAUs as well as with international organizations such as the FAO, IBPGR and other international centres.

10. *Strengthening research in less-developed areas and on the problems of poorer segment of agricultural population*: It is necessary to strengthen research efforts in backward areas having weak research infrastructure for minimizing regional imbalances in agricultural production and productivity and meeting the needs of different ecological regions and of the small farmers and poorer segments of the agricultural population.

11. *Energy management:* An intensive research effort should be made to utilize non-conventional energy sources.

12. *Farm machinery and power:* More research is needed on the development and use of improved implements for agricultural operations specially for achieving precision, efficiency and timeliness of operations and also removing drudgery of farm operations carried out by rural women.

13. *Research in home science:* Special thrust should be given to the evaluation of nutritional efficiency of new varieties of cereals and other foodgrains and development of technology for making the work chores in the home easier for rural women.

14. *Marketing research:* Research efforts are needed on the marketing aspects of various agricultural commodities.

10.7 In Animal Science Research, the following thrust areas are identified:-

1. *Genetic improvement of livestock:* Intensive efforts should be made on developing breeding strategies for increasing the productivity and efficiency of production of livestock and generating superior germplasm.
2. *Animal genetic resources conservation and management:* Basic research required on genetic resource identification through cytological, immunogenetic and biochemically polymorphic characteristics and *in-situ* and *ex-situ* (cryo-preservation of sperms and embryos) conservation needs to be initiated.
3. *Intensification of research on non-conventional feed resource:* Since feed is the most important limiting factor and there is little possibility of increasing the area under cultivated fodder production, dependence on crop residues and agro-industrial byproducts will have to continue. Identification and evaluation of new non-conventional feed resources and developing more effective methods of their utilization, specially through manipulation of rumen environment and utilization of bypass protein and energy, should receive increased attention.
4. *Development and utilization of bio-technological innovations for animal production and health:* Research and application of newer bio-technologies related to multiple ovulation embryo-transfer technology, specially sexing, cloning, micro-manipulation, development of transgenic animals, for intensifying genetic gains, and molecular biology and DNA recombinant technology are required for developing cheaper and more effective diagnostics and vaccines.
5. *Disease surveillance and monitoring:* Research should be intensified on standardizing the methods for disease surveillance and monitoring and possibly forecasting of important animal diseases and evaluating the available control and eradication measures. This will also include establishment of high-security animal disease laboratory facilities for tackling emerging and exotic diseases.
6. *Intensification of research on meat production and processing technology:* More research is needed on different aspects of meat production, slaughter techniques, live-animal and carcass evaluation, and meat processing and preservation.
7. *Dairy development:* Different aspects of increasing milk pro-

duction, reducing bulk using membrane technology, ultra-high-temperature treatment of milk and labour- and energy-saving methodologies in handling fluid milk and preparing intermediate and final indigenous dairy products should receive great emphasis.

10.8 In fisheries research, the following thrust areas are identified:

1. *Culture fisheries:* More research is needed on seed production of quality fish, feed formulation for monoculture genetic studies of cultivated and culturable fish, steps for domestication and development of genetically superior strains with desirable characteristics. Emphasis should be laid on increasing production in ponds and tanks by manuring and fertilizing appropriate to quality of "natural pond bottom soil" and strengthen the system of polyculture (composite fish culture) already developed in the country. Major thrust is to be given to running-water aquaculture.
2. *Capture fisheries:* Developing balanced fish population based on prey-predator relationships and the effect of river pollution on stock of fish and aquatic biotic factors should receive adequate attention.
3. *Fisheries technology:* Emphasis should be laid on the standardization of product development of various types. Gear and crafts should be developed for exploiting pelagic, column and demersal resources of our seas. Development of devices like fish feeders, aerators, water heaters and sluices should receive more attention.
4. *Fish genetic resources:* Special efforts are needed for developing a gene pool of indigenous cultivated and culturable species of different ecosystems.

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AGRICULTURAL RESEARCH RESPONSIBILITY OF THE ICAR

10.9 The national agricultural research activities under the ICAR can be broadly divided into the following categories:

(1) National Research Institutes - IARI, IVRI and NDRI (3)
(2) National Academy of Agricultural Research Management (1)
(3) Central Institutes, Commodity Institutes and National Bureaux (41)
(4) National Research Centres (26)
(5) All-India Co-ordinated Research Projects (76) and Project Directorates(9)

10.10 Agricultural research is no doubt a continuous process of investigation, but is generally classified into 4 categories, one leading to the other. These are:

(1) Basic research: it aims at study of principles;
(2) Strategic research: it aims at study of processes or mechanisms;
(3) Applied research: it aims at development of products of economic value;
(4) Adaptive research: it studies the adaptability of products in different environments.

10.11 Research is also necessary in the evaluation of technology, its adoptability to specific environments and its probable impact on utilization, and the mechanism and methodology of transfer of technology and its impact.

10.12 So far, there has been no clear-cut demarcation of responsibilities in areas of research between the ICAR Institutes on the one hand, and the SAUs on the other; also the responsibility of different categories of research in the Institutes of the ICAR is not well defined. Without proper demarcation of R&D responsibility and delineation of authority accountability in fulfilling the R&D assignment is not possible. Time has now come for the identification of the major research responsibilities and accountability of the ICAR Institutes and the SAUs.

10.13 Since the SAUs are directly responsible for conducting research in the states to suit the needs of their ecological zones and subzones, it is logical to expect them to have comparative advantage in taking leadership and assuming responsibility in applied and adaptive research over the Central and National Institutes which, with their better facilities and trained manpower, should concentrate on basic and strategic research. This, however, does not mean that the SAUs are barred from conducting basic or strategic research. The question is actually one of the relative priority and thrusts; there should be nothing to prevent the SAUs with advanced research capability from undertaking any type of research, but they cannot do so at the cost of applied and adaptive research relevant to the needs of the States. The basic and strategic work at the ICAR Institutes and the applied and adaptive research at the SAUs should be compatible and complementary and should converge on a national focus for crop, livestock and commodity improvement and production. The All-India Co-or dinated Research Projects are good examples of this. To ensure optimum utilization of manpower and facilities, we recommend the following demarcation of responsibility to the various research units under the ICAR.

NATIONAL INSTITUTES

10.14 The three National Institutes, which are also deemed Universities (NDRI is likely to be declared soon), have to play a national role in concentrating on basic and strategic researches and human resources development through M.Sc., Ph.D., Post-doctoral and in-service training programmes. They should be considered Central Universities to meet the needs of the future. They should also be made responsible for applied research in the commodities or problems for which no specialized research Institute, centres or other mechanism exist. Those research responsibilities should be clearly defined keeping in view the national priorities and resources. To enable them to orient their activities to achieve these goals, the following steps may be necessary.

1. The National Institutes should be considered the autonomous Central universities subject to similar control of the ICAR as the UGC has over the other Central Universities. However for commodity research specially assigned to them, they will have responsibilities similar to other Commodity Institutes consistent with their management, autonomy and national priorities and goals.
2. They will confine to basic and strategic research in different disciplines. The priority area for such research will be decided jointly by the ICAR and the Research Advisory Committee of the concerned Institutes. They will get block grants for research and will be accountable to the ICAR for research output. In addition, they will have the responsibility for applied research only in those commodities and problems for which no other ICAR institute or mechanism exists.
3. For enabling them to do the basic and strategic research, it will be necessary to carefully screen the existing staff, assess their strength and weaknesses, upgrade their capability through training where possible and shift the staff with greater aptitude for applied research to other Central Institutes or programmes where their experience and capabilities can be used more effectively. We wish to emphasize that the greatest strength of Indian agriculture is technical manpower which should be used efficiently for meeting the national challenges and goals in research, education and transfer of technology and removing imbalances.
4. It will be necessary to provide the National Institutes with modern equipment and more operational budget for increasing their capability for research. We wish to emphasize that accountability and responsibility should be matched with resources. There is an evidence of mismatch between technical manpower and research facilities and some of the

Institutes are over-staffed. We suggest that a maximum cadre strength compatible with the responsibility in the institute should be fixed.

5. We also wish to emphasize that for co-ordinating wheat research, the Project Directorate of wheat located at the IARI should be strengthened for strategic and basic research by suitable adjustment of staff and resources. The wheat disease research centre at Shimla and off-season nursery centres at Wellington and Dalang Maidan should be fully integrated with it so as to make the Directorate as a National Wheat Research Centre and a self-contained organization. In view of the importance of wheat in India and suitable location of the IARI, the Directorate of Wheat Research should gradually become a Central Institute for Wheat Research with similar autonomy as other Central Institutes have. It should collaborate with the CIMMYT and other reputed centres of wheat research freely.

There are probably similar possibilities of identifying and strengthening some specific activities at the other two National Institutes, viz. IVRI and NDRI. These should be critically examined by a panel of experts.

NATIONAL ACADEMY OF AGRICULTURAL RESEARCH MANAGEMENT

10.15 The ICAR is one of the few organizations that had taken initiative in organizing a full-fledged national centre for providing training in Agricultural Research Management. As increasingly large investments are made in agricultural research, the question of efficiency and effectiveness of research management becomes particularly important. The mandate of the NAARM should be not only the training of young scientists in the various aspects of research project management, but also in organizing training programmes and workshops for the senior research managers such as the Heads of Division, Project Co-ordinators, Assistant Directors-General, Joint Directors and other senior staff. It should conduct research to augment its training programmes in areas such as national development policy, structure and organization of National Agriculture Research System, technology-transfer linkages, formulation of programmes and their budgeting, information-management systems, management of physical resources, agriculture research and policies, monitoring and evaluation of research, management of human resources and, management of financial resources. It should try to develop a new ethos for science promoting interdisciplinary involvement of scientists in problem-solving research.

10.16 An Advanced Centre of Educational and Research Management has recently been established at the NAARM with international assistance. This centre should provide support to the SAUs in the development administration and management of educational programmes including courses and curriculum development, technique of teaching and communication systems. Thus the functions and activities of the NAARM would transcend all the ICAR Institutes and the SAUs which are the two major arms of the National Agricultural Research System.

CENTRAL AND COMMODITY INSTITUTES

10.17 They should be responsible for resident research of strategic and basic type relating to the mandated commodity or area of concern and for supporting, encouraging and co-ordinating applied research in collaboration with the SAUs. In fact, they should become the focal points for all type of research relating to the mandated commodity or problem area research at the national level.These Central Institutes should develop into Centres of Excellence providing leadership and specific expertise in their areas of operation.They should work in close collaboration with the SAUs, and where necessary with the National Institutes also. The technical autonomy and leadership role that they enjoy should be of an unquestionable nature with a brain trust of a high order, stimulating development and interaction of ideas.

10.18 The backward regions like the North-Eastern States, the Andaman and Nicober islands, Lakshadweep and some small States and Union Territories which have at present a weak research infrastructure, face serious problems such as stagnation of yield of crops and inadequate technology for pest management, soil and water management, animal production and health and fisheries. In view of their inadequate infrastructure to solve these problems it is suggested that the concerned mother institutes like the CRRI, CPCRI, IVRI, CMFRI, etc., which have the requisite expertise in specific areas, should have special responsibility to provide the necessary technical backstopping in research and training to the stations established in these regions. Efforts must also be made to establish the required research infrastructure in these regions and to develop the available manpower through appropriate training conducted in the ICAR institutes. Assigning experienced scientists and technicians drawn from the ICAR Institutes for problem solving researches and assisting them in research planning and implementation processes should be given the highest consideration. These should be time-bound and goal-oriented assignments and necessary incentives should be provided to attract competent scientists. The technology transfer using the result of research relevant to those areas should be taken up by the concerned ICAR Institutes until such time as these States and Union Territories develop their own extension agencies. If a Central University for the North-Eastern region is set up later, these activities should be merged with it.

NATIONAL RESEARCH CENTRES

10.19 Around 1978, the ICAR conceives the idea of setting up a number of National Research Centres (NRCs) as an addition to the existing research infrastructure of the ICAR Research Institutes and the All-India Co-ordinated Research projects. The philosophy of this new system revolves around the need for concerted attention on selected topics which have direct or indirect relevance to solving national problems in a particular crop or commodity or a problem area of research. The concept of NRCs differs from that of the ICAR Institutes and the AICRPs. The NRCs are devoted to a single or a few selected crops, animal species, commodities, or problem-oriented interdisciplinary research on a sharply focussed mission. They will feed the national network of research with new materials, technology and information, for subsequent adoption in the different production-oriented research programmes. The NRCs do not have divisional set-up nor any sub-centre. We recommend that they should become centres of excellence for the specific mission-oriented research and should co-operate with the AICRPs and the SAUs in solving problems of national and regional importance. We find in the Seventh Plan, the ICAR has sanctioned 26 NRCs. We recommend that most of these NRCs should take responsibility of the related AICRPs where ever they exist. Where the NRC and AICRP are located at two different sites, the possibility of bringing them together administratively and technically should be examined. They should plan their programmes together under the advice of the Research Advisory Committee and should ensure complementarity of research. The annual programmes and progress of the NRCs should be critically reviewed and integrated with the national priorities in research.

10.20 Most of the work done on sorghum so far has been on the *kharif* crop. *Rabi* sorghum is grown in 40% of the area but has lacked sufficient attention so far, probably because of the non-availability of an appropriate location with adequate resources. The National Research Centre on Sorghum, which has been recently established needs strengthening to carry out this work by identifying a suitable location for research and shifting the scientists to the area where *rabi* sorghum is extensively grown.

10.21 We also do not feel convinced that all the NRCs should be ICAR research centres. Some of them could be considered NARPs of SAUs as the projected programme is of local importance and the SAUs have responsibility and comparative advantage for this research relevant to the States. The co-operative arrangements with the SAUs or State Research Institutes may be developed so as to ensure local participation. We welcome the proposed NRCs on biotechnology at IARI, NDRI and IVRI, as new frontiers of agriculture science. Mithun is important for Nagaland and Arunachal Pradesh and should become the NARP of the proposed Central Agricultural University for the North-Eastern States. Some of the NRCs could be integrated with the relevant Central Institute e.g. dryland horticulture with CRIDA.

10.22 There does not seem to be any strong argument for the NRCs on Integrated Pest Management and Weed Control; such work could be carried out at any of the ICAR Institutes. The proposed NRC on Water Technology, meant for Eastern India, perhaps for management of excess water, also could be located under the SAU in Assam.

10.23 We do not see the need for a separate NRC on medicinal plants as the CSIR has already set up its Central Institute for Medicinal and Aromatic Plants (CIMAP) at Lucknow and ensured the collaboration of the Central Drug Research Institute (CDRI) and the National Botanical Research Institute (NBRI), Lucknow.

ALL-INDIA CO-ORDINATED RESEARCH PROJECTS (AICRPs)

10.24 The All-India Co-ordinated Project is a unique mechanism in building a nationwide co-operative interdisciplinary research network linking the ICAR Institutes with the SAUs to focus attention on commodities and species of national importance. There are 85 such projects today and most of them have been operating continuously for over a decade and some even for three decades, e.g. maize and agronomic trial project (now called Cropping Systems Directorate). The AICRP concept of these projects was to pool together national resources, technical and material, for effecting a breakthrough in production, by (i) generating an improved technology through interdisciplinary research and (ii) evaluating the suitability, adaptability and transferability of technology to different ecological regions.

10.25 They have proved to be the most effective instruments for the development and transfer of improved technology and creating a co-operative research network in the country. The ICAR should be complimented for this outstanding achievement. As a matter of fact, development of such a concept has been a source of inspiration to many developing countries.

10.26 However, in the last 25 years, there has been much expansion and multiplication of the AICRPs, and many distortions and problems of technical, operational and administrative nature have cropped up. Therefore, a critical analysis of the AICRPs is needed keeping in view the experience of the past and the needs for the future and to make the system effective, dynamic and responsive to the changing scenario.

10.27 During the last 25 years or so, two important developments have taken place in the States which have a bearing on the present and future functioning of the AICRPs.

(i) The research capabilities of the States have considerably improved with the establishment of the SAUs and the availability of a large number of qualified and competent scientists.

(ii) The launching of a chain of regional research stations under the NARP, all over the country, under the full control of the SAUs.

10.28 The question arises: (a) whether so many Co-ordinated Projects are necessary, (b) whether all of them really conform to the philosophy of interdisciplinary research targeted to a product, (c) how long should a project run to achieve a sharply focused objective, (d) is the mechanism and pattern of funding of the AICRPs suitable to meet the needs of the projects of plant protection, soil and water and engineering research.

10.29 It is also possible to develop a single disciplinary or interdisciplinary multi-centre strategic research at several locations based on specific needs of the area and develop a collaborative network between them for sharing of information and materials. These may be called National Cooperative Network for Strategic Research, which will have the advantage of avoiding a straight-jacket approach to individual creative attempts. Every centre in the network should develop its strategy and work-plan targeted to solve a problem, designed in such a manner as to encourage creativity and initiative.

10.30 It has also been brought to our attention that many technical, administrative and operational problems and drawbacks have cropped up which threaten the very concept of evolving improved technologies through co-operative efforts. Some of these are:

a. Inadequate focus on local problems in research programmes;

b. Excessive emphasis on uniformity of the experiments and straight-jacket approach in research;

c. Inadequate financial resources and delay in release of funds;

d. Sub-optimal utilization of resources;

e. Lack of effective monitoring; and

f. Weak links with extension.

10.31 The Committee has discussed in depth the operation of these projects and had the benefit of interaction with experts who carried out a sectorial review on the achievements of these projects. The contributions made by these projects to crop, animal and commodity improvement programmes are significant and commendable. Their working can be considerably improved by rationalization and regrouping.

Streamlining the Working of the Projects in Single-Commodity Institutes

10.32 In some single-crop/commodity Institutes of the ICAR, differences of approach between the Directors and the All-India Project Co-ordinators are clearly visible which are having an adverse impact on research. Most of the Directors are of the view that unless this problem is resolved, the progress of research will be tardy. The Co-ordinators also feel that they do not get full support of the Directors and often become victims of dichotomy. The lack of accountability of the Institute Directors for the AICRPs also affects the smooth working of the project. In view of this problem, we suggest that the Director of the Institute should be recognized as the national leader for co-ordinating the resident and co-operative research at the Institute level. He should be assisted by the Joint Director for co-operative research in the Institute who should be the Co-ordinator of the AICRP and exercise complete control over his budget programme and travels. The Director should have responsibility for resident research of basic and strategic type to back up the co-ordinated research programme and develop new approaches and technologies to increase productivity and economies of the commodity. The research programme of the Institute and of the AICRP should be integrated. The Director should have additional responsibility to facilitate the work of the Co-ordinator. He will be directly responsible to the ICAR Headquarters for all scientific, technical and administrative matters within the framework of the autonomy of the Institutes as suggested earlier.

10.33 Wherever absolutely essential, another post of a Joint Director (Resident Research) in the Institute should be created so as to free the Director to visit the centres of the co-ordinated programmes and bring the field problems back to the Institute, thus facilitating upstream research. Even where the Institute and the AICRP are located at different sites, there should be a total integration of their technical programmes.

Make the Project Co-ordinators Role More Effective

10.34 The primary function of the Project Co-ordinators is to monitor the work of the different centres, prepare plans for the new programmes, oversee the exchange of breeding material and information, and compile annual reports and other documents related to the project activities. These are very vital functions and it should be ensured that the Project Co-ordinators are helped in every way to discharge them fully.

10.35 Curiously enough, the question of late is being asked whether a Project Co-ordinator should or should not engage himself in research activity. Many have insisted that the Project Co-ordinator's function is only to co-ordinate. The Project Co-ordinator must be considered an active working scientist of a higher level; reducing him to the role of a mere facilitator of programme (in the bureaucratic sense) would keep him away from research, which would not be in the interest of research and his career development. The Co-ordinator should be encouraged to undertake research, but should not compete with his research colleagues for recognition. On his part, he must not be found wanting in co-ordinating responsibilities while conducting research work of his choice.

10.36 Some persons have argued that the permanency of tenure could tend to make the Project Co-ordinators rather complacent and suggested that the Project Co-ordinators should be recruited at S-4 level on a tenurial basis so as to help induction of younger blood at regular intervals. While

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there may be some validity in this suggestion, it would have to be ensured that changes are not made too frequently. As in the case of the senior functionaries in the ICAR system (Heads of Divisions, Directors of Institutes, DDGs and ADGs), the Project Co-ordinators should be appointed through a proper selection procedure (not on the basis of seniority) and their tenure should be for an initial term of five years. Subject to satisfactory performance, grant of additional term of tenure should also be considered. The Project Co-ordinator should not be restricted to any one discipline. He should be the ablest man out of interdisciplinary teams and should not be below the Professor's level. He should be of a substantive stature and specialist in his area of specialization.

Ensuring Adequate Manpower Support

10.37 There seems to be adequate provision of staff at the different Centres of the AICRPs. But most of the Centres have suffered in their implementation due to repeated transfers of the staff. The ICAR must insist with the SAUs that the scientists appointed are not shifted before the completion of at least three years in the same project. However, during this period, if the incumbent gets the benefit of a promotion as per normal University regulations, he should be permitted to avail of it in the ICAR project itself. The ICAR should meet the additional cost involved, considering it a price for maintaining the continuity of staff.

Provision of Adequate Contingent Grants

10.38 The level of support for recurring contingencies is too inadequate to assure performance of high standard. A system of uniform allocation of Rs 12,000 per scientist per year itself speaks of the arbitrary approach to this problem. Labour wages differ from State to State, but the ICAR norms for contingencies are the same in every State. The requirements of contingencies will depend on the nature and quantum of field and laboratory work, which is bound to differ from one discipline to another. Therefore, norms should be developed on the basis of different requirements of different disciplines. We feel that the ICAR should consider providing 30-40% non-salary costs for meeting all operational needs of the research project and the Project Co-ordinator should be empowered to change the allotment from one item to another, if necessary. Also, travel grants are grossly inadequate and unrelated to rise in travel costs. This comes in the way of many Project Co-ordinators visiting all the Centres. This also needs to be remedied.

10.39 A serious matter relates to the diversion of funds by the SAUs in respect of the TA and recurrent contingency grants. Sometimes the scientists from the project are deployed for other work and their TA expenditure is met from the project budget. The ICAR should take steps to prevent this.

Working Relationship with Other Programmes

10.40 The AICRPs should maintain close relationship with the NARP Centres located in the different agro-ecological regions, National Bureaux for Plant, Animal and Fish Genetic Resources and the CG Centres for obtaining new germplasm, advanced breeding material and relevant methodologies for effective research. Collaborative research projects should be developed with the CG Centres to take fullest advantage of their organization and scientific advancement.

Technology Generation

10.41 The present practice of developing a common programme for all the Centres at the national workshop meetings would have to be considerably modified. The research programmes, from now on, should be developed by the researchers mainly to meet the needs of the States and its farmers in the different agroclimatic zones and farming situations. Every centre should also have the responsibility to generate technology instead of becoming only a service centre for testing the material generated by others. The role of the Project Co-ordinators would be to integrate the research programmes of the Centre and States, identify the common goals and focus researches on meeting the State or regional needs. The Project Co-ordinator should take a holistic approach to integrate the research for making the national and the regional/zonal/subzonal needs.

All-India Workshops

10.42 We understand the All-India Workshops have gone down to the stage of rituals for common varietal and agronomic field testing, and joint interdisciplinary sessions are a rare phenomenon. More time is spent on formal routine functions than on scientific discussion. It is necessary to cut down the periodicity of these Workshops, and hold them, not annually, but perhaps once in two years. A crisp report on the contributions and achievements of the Project should be brought out at this time and critically discussed. The annual meetings should be devoted to regional and zonal meetings of interdisciplinary groups for research planning and review purpose. With the Project Co-ordinator and the ICAR commodity and Central Research Institutes directly acting as a motivating and driving force, those meetings should critically discuss the programme of the Institute and of the All-India Co-ordinated Research Projects. There should be more scientific discussion rather than canvassing for release of one's own varieties.

Interdisciplinary Research Needs Emphasis

10.43 We feel the present tendency of appropriating the credit by one discipline is working against the interdisciplinary team approach. We suggest that the ICAR should recognize team-work rather than one-discipline work while giving credit for a final product or technology. A newer approach, from now on, would be for the scientists of the basic disciplines (breeding, agronomy, plant pathology, entomology, crop physiology -- individually and jointly), at the "main research centres" of the AICRPs, to engage themselves on evolving research strategies and approaches with a view to pushing crop productivity significantly above the presently plateaued level, to incorporate multiple resistance to diseases and pests and environmental stresses into newer crop varieties.

National Testing Programme

10.44 For technology transfer and evaluation of its adaptability under different ecological conditions, the present system of testing is not very satisfactory. We suggest that a national-level testing programme for technology evaluation or adaptive research programme should be evolved jointly by the ICAR and the SAUs. The SAUs should develop a network system for technology evaluation and transfer in the State. They should make use of the products arising out of national, regional and international programmes. The emphasis should be on regionally and ecologically adapted materials and package of practices. A team of agronomists, economists, soil scientists and plant protection scientists should take this responsibility. The Directorate of Extension Education should be suitably strengthened, and co-ordinated network for technology transfer evolved with ICAR support. This adaptive research should also help in bringing the field problems and constraints to researchers besides taking the results of research to the field. Many of the extension-oriented projects of the ICAR can be merged to evolve a national-level co-operative organization for technology evaluation and transfer, and the ICAR should play the role of monitoring the progress and critically evaluating results for practical significance. It should be a two-way traffic upstream and downstream from the ICAR Institutes and programmes to SAUs research to SAUs extension education and training and back to the ICAR.

Strengthening Monitoring Mechanisms for Greater Effectiveness

10.45 The Project Co-ordinator/Director, and/or members of their co-ordination units, would be the primary resource persons for monitoring research trials under the respective AICRPs. Besides the Project Co-ordination Staff, the ICAR Headquarters will help to keep a better and more effective watch on the proper utilization of the project funds, and also to ensure that project staff are not transferred and the vacant posts in the project are filled expeditiously.

Mechanism of Sharing Funds between the ICAR and the SAUs

10.46 When the AICRPs were first started, the ICAR agreed to give grants, to each SAU and each ICAR Institute, on a 100% basis inclusive of staff salaries and recurring operational costs. During the Fifth Five-Year Plan, the proportion was changed to 75% ICAR: 25% SAUs. Some of the projects have run for more than ten years, some more than twenty years, and a few (e.g. maize) for thirty years. The question that may be asked is whether the ICAR should continue to fund these projects on the present basis ad infinitum. We recommend that, from the beginning of the Eighth Five-Year Plan, the following funding policy be adopted by the ICAR:

(a) For new projects, initiated during a plan period, 100% funding be provided by the ICAR. After five years or completion of the first phase, a critical review should be done to evaluate the achievements of the objectives and determine the necessity of continuation during the next 5 years.

(b) For the second cycle of five years, a 75% ICAR : 25% SAU pattern of funding, as is being followed at present, be continued, provided there is a need to continue the project for completion of certain objectives. Most of the projects should be discontinued after the first ten years. If it is necessary to continue them beyond ten years, a time-bound project with well-defined objectives, with a revised title, should be formulated. We realize that the commodity will be the same but the objectives should be changing, and it is desirable to give some quantitative parameters for assessment of the fulfilment of objectives.

(c) For projects which have continued for more than ten years, the States may put up specific project proposals in areas where they would like to continue the work. The proposals may be critically reviewed by the ICAR and, if approved, the projects may be funded on a 50% ICAR :50% SAU basis. If no new proposals are received from the SAUs, the present AICRPs may be allowed to continue in the SAUs on a 50% : 50% cost-sharing basis, with the understanding that the financial support from the ICAR will end after the term is over. We suggest that for projects which have been running for more than ten years and are authorized for the Seventh Five-Year Plan, a critical review by an expert committee should be made before taking them to the Eighth Five-Year Plan. A critical analysis should be made of the on-going and proposed All-India Co-ordinated Research Projects taking into account their need, relevance, amenability to co-ordinated set-up and desirability of having a large number of locations. All projects, which have been started on or before 1st April, 1981 should be reviewed. We recommend the appointment of a task force specifically for this purpose at least before the formulation of the next Five-Year Plan.

10.47 It is unfortunate that many of the SAUs are getting poor financial support from the parent State for agricultural research and they depend heavily on the grants of the ICAR in the form of Co-ordinated Research Programmes. But for these funds, their research organizations would collapse. We recognize that it is the States' responsibility to provide the basic support for research relevant to those States' needs and they should be made to realize their responsibility. We also would not like to see the research organizations of poorly funded SAUs collapse for want of proper backing by the State and the ICAR. We suggest that the ICAR should develop a mechanism for ensuring that minimum financial support for research on similar lines, as is being provided for educational programmes, is given to the newer SAUs so that they are able to maintain their research infrastructure and are capable of collaborating with the national programmes. However, it should be ensured that the programme is based on the principle of efficiency and productivity of research and priority of regional/national objectives. The non-productive and non-performing research projects should not be supported. We are afraid that unless the SAUs have basic support for research, they are likely to get cut off from the main stream of national research which, besides affecting the national programmes, will affect the educational programmes of the University.

10.48 It is also observed that there is an unfortunate trend of multiplication of the SAUs in a State. We suggest that the ICAR should at least support research in one SAU in the State and select a priority campus for the AICRPs based on the merits of each case. The centres for research projects should be selected keeping in view the national perspective and capability and ability of the scientists so that excellence is rewarded and brain-drain avoided.

10.49 A few cases can be cited as illustrations of the desirable changes in the AICRPs:

(i) Shifting of a significant part of the co-ordinated sorghum programme to *rabi* sorghum areas such as the MPAU (Rahuri) to focus attention on *rabi* sorghum, and pearlmillet programme to western Rajasthan [CAZRI, (Jodhpur), or SAU, (Bikaner)] to meet the needs of the most important regions of these crops.

(ii) Restricting the focus of the project on forages to only one or two important forages in each region.

(iii) Conversion of the project on improvement of physical conditions of problem soils, and the project on utilization of byproducts of industry and crop residue into pilot projects/operational projects.

(iv) Merging weed control research with the activities of the ICAR commodity Institutes and the SAUs.

(v) Giving greater importance to research in pulses by (a) Restricting the existing co-ordinated project to pigeonpea and chickpea for intensification of research with a whole-time Project Co-ordinator; and (b) Developing a separate new project for other pulses such as mungbean, urdbean, *Phaseolus* bean, lentil, etc., each under a separate project leader and co-ordinated at the level of Directorate of Pulses Research, Kanpur.

(vi) Giving greater importance to research on oilseeds by creating two separate projects: (a) Co-ordinated Research Project on groundnut linked with the NRC for groundnut, Junagadh, and (b) Co-ordinated Research Project on rape, mustard, linseed, safflower, sunflower, castor, niger, etc., each crop under a separate project leader, and all of them responsible to Directorate of Oilseeds, Rajendranagar, Hyderabad.

(vii) Considering the transfer of the Jute Technology Research Institute to Department of Commerce, Government of India, or to a relevant research organization in West Bengal.

(viii) Decentralizing the cropping system research to the SAU and making it obligatory on them to meet the needs of different ecologies -- the ICAR taking responsibility for monitoring and reviewing the programme critically. The ICAR should provide basic grant not less than 50%.

10.50 We recommend that these cases may be considered for implementation. Immediate steps should be taken to critically review the projects in other divisions of the ICAR and recommendations developed for action within a year.

National Agricultural Research Project (NARP)

10.51 The NARP was launched in 1979, with IDA assistance, with a view to assisting the SAUs to conduct location-specific, need-based and production-oriented research on a permanent basis in agroclimatic zones and subzones identified in their respective service areas. In the country as a whole, 126 distinct agro-ecological subzones have been identified and the NARP is expected to cover all of them.

10.52 Strengthening of regional research on a scientific agro-ecological zone basis has been one of the most significant positive developments that has taken place in the organization of agricultural research. An awareness on developing mission-oriented, problem-specific, relevant research with multidisciplinary thrust on regional farming situations is one of the most desirable change that the NARP has been able to introduce. Interaction of farmers as ultimate consumers of research in developing research programmes has resulted in a desirable grass-root bottom-up planning. These desirable changes should be consolidated by integrating the various components of relevant regional research into a meaningful programme of action.

10.53 The Project was not conceived as a separate agricultural research project but as a mechanism for regionalizing research to make research and technology more suitable for adoption in the respective agro-ecological zones and subzones. Each region was expected to prepare an inventory of resources and systems of cultivation as a basic document for identifying regional needs. Integration of all projects, irrespective of the sources of funding in a region was aimed at to make optimal use of available resources and scientific personnel. It has been observed that the desired level of co-ordination and integration of the other programmes of the SAUs with the research programmes of the NARP has not yet been achieved at most locations. It appears that there is a lack of co-ordination at the ICAR Headquarters.

10.54 The technical subject-matter divisions dealing with research programmes are not fully involved in (a) programme formulation of the different agro-ecological zones, (b) integrating the strategy with national priorities and requirements and (c) monitoring the progress of the NARP. We recommend that this defect should be removed. The emphasis of the NARP in the first phase has been on crops. We recommend that other areas like fisheries, poultry, animal science, horticulture, post-harvest technology, etc., need to be strengthened by including them in the future NARP programmes.

10.55 At the zonal level, integration between the NARP and other projects in all areas supported either by the ICAR or the State should be ensured. This shall be the responsibility of the SAUs concerned. For the Zonal Advisory Council Meeting, Project Co-ordinators of the projects working in that area should be invited so that the technical programme for the AICRPs at the national level and the Regional Stations at the zonal level get integrated.

10.56 As per the agreement between the ICAR and the SAUs, the responsibility for continuing the NARP project at the end of five years rests with the SAUs. There are indications that some SAUs and State Governments are not honouring this commitment, thus seriously hampering the regional research efforts and defeating the purpose of the project. We suggest that the implementation of this arrangement should be ensured so that regional capabilities of the SAUs stand permanently strengthened.

OTHER PROGRAMMES

Ad-hoc Research Schemes

10.57 By virtue of the Agricultural Produce Cess Act, the ICAR received funds for financing research projects on a short-term and result-oriented basis. A large number of such schemes are funded on a 100% funding basis (50% sharing of costs in respect of State Government Institutions) in different disciplines of agriculture, animal husbandry and fisheries. The objective of these schemes is to fill critical gaps in the scientific field, or in the resolution of problems limiting production. They are funded generally for a three-year period, and not beyond five years.

10.58 A general complaint is that the procedure of processing these schemes is lengthy taking even up to two years from the date of submission of the scheme. A procedure for cutting down delays must be evolved. A list of bottleneck research problems of national importance and regional relevance should be prepared by the ICAR including suggestions and proposals from the SAUs. These should be allotted priorities and the SAUs asked to submit brief proposals giving objectives, lines of investigation, expected outcome and financial implication. The DDG concerned should be empowered to sanction projects with an outlay of up to Rs 5 lakhs. The DG should be empowered to sanction projects above this limit on the basis of the recommendation of the Scientific Panels. A further reference to Finance need not be there in either of these cases. The support personnel provided under these schemes should enjoy the same pay scales and privileges and staff seniority status as those prevailing in the Institutions in which they function. This will facilitate their eventual absorption on a permanent basis when the schemes terminate. The funds could be used for building up 'Schools of Thought' around leading scientists. No project should be for more than five years.

Centres of Excellence and Advanced Centres of Research with UNDP Support

10.59 The ICAR, with the support of the UNDP, has set up a number of Centres of Excellence and Advanced Centres of Research for specialized areas of agricultural research and post-graduate education. The schemes are valuable for the further development of agricultural sciences. It is understood that the subject-matter divisions at the ICAR Headquarters are not sufficiently associated in the development of the technical programmes of these projects. It is suggested that this constraint should be overcome by fully involving the Technical Divisions, at the level of the Deputy Directors-General, at the project planning and review stages.

Professors of Eminence and National Fellows

10.60 The ICAR has also launched a programme known as the "Professors of Eminence and National Research Fellows Scheme". The objective has been to identify scientists of outstanding merits who could provide leadership in the development of 'Schools of Thought' in specified areas of fundamental/path-breaking research at high levels of excellence. The scientists selected under this scheme work on a specific project formulated by them. Liberal provisions are made to them for the needed physical and infrastructure facilities for the operation of their projects, and the incumbent operates with complete financial and administrative autonomy.

10.61 The Committee feels that these Schemes have not accomplished the purpose for which these were instituted. The Committee recommends that these Schemes in their present form may be discontinued. However, to encourage the basic research in agriculture and allied subjects and to build schools of basic research around the eminent Scientists, the ICAR may consider constituting a High-level Committee of Experts to identify the scientists working in basic research related to agriculture and allied subjects and support them through provision of funds for equipment, contingencies and additional manpower, if required. Such support may be given on project basis. Since both in the ICAR and in the SAUs the scientists will be reaching a similar pay as earlier provided for the Professors of Eminence, there is no need to provide any financial incentives for such identified scientists.

Effectiveness of the Existing Monitoring and Evaluation Mechanisms

10.62 The present mechanisms for monitoring and evaluation of the research programmes of the ICAR Institutes and those of the SAUs are quite inadequate, if not altogether non-existant. Some of the Institutes/programmes even do not produce a scientific annual report. The DDGs and ADGs at the ICAR Headquarters are rendered immobile for almost half the year due to the need for their presence at the Headquarters because of Parliament Sessions. We suggest that the ICAR should enable the senior scientists, particularly the DDGs, to monitor and evaluate research more effectively and assist in improving research progress. This kind of interactive process should be encouraged to operate on a continuing basis. Evaluation through annual reports, or reports of Quinquennial Review Teams (QRTs) is one of the mechanisms of evaluation, but the review process should be further strengthened and the recommendations implemented.

10.63 At present the ICAR is appointing QRTs separately for Institutes and AICRPS though both may be working on a single crop/commodity/species. In such cases, we strongly suggest that there should be only one QRT which evaluates the achievements for both, as the research thrusts will be the same.

10.64 It is further suggested that each ICAR Institute should have a Research Advisory Committee which should include eminent (serving or retired) scientists and also persons/scientists from outside the ICAR system (e.g. CSIR, DST),other Government research establishments, or the industry. In addition, each ICAR Institute should organize regular, in-house programme reviews as is done in the International Agricultural Research Centres. Further, the ICAR should assist the SAUs for conducting quinquennial reviews of at least their research programmes, with the help of eminent outside experts. The ICAR could offer to meet the cost of such reviews of the SAUs. We are convinced that the ICAR has to create a strong technical set-up for monitoring and reviewing of progress of research as discussed earlier in ''organizational structure''.

10.65 We also strongly recommend that all the research work carried out within the Institutes should be on ''project basis'' with specific time and cost scheduling. The time scheduling will be useful in monitoring progress of the projects and evaluating their performance, while the cost and resource scheduling would ensure optimization of available resources. Project proforma may be modified, if necessary, to include these details.

National Research Policy Planning Committee

10.66 At the national level, the ICAR should create a Standing Policy Planning Committee, whose primary and crucial role will be strictly research policy planning, forward-looking, and goal-setting. It should consist of eminent scientists (serving or retired) from the ICAR and the SAU systems, and from sister research agencies such as the CSIR, ICMR, etc. It can also enlist the support of subcommittees or Scientific Panels as need be. The proposals relating to the establishment of new Institutes/ regional substations/new programmes of research should be frozen at the current level till the Standing Policy Planning Committee formulate views on newer national research priorities and policies.

Future Outlook

10.67 The ICAR should be a forward-looking research organization and its Institutes should be evolving and not static. Continuous upgrading of the knowledge and skills of scientists and facilities of research in the existing Institution should be given the highest priority.

(i) The family of the ICAR Institutes has overgrown itself over the decades; within each Institute, there has been large, and perhaps unjustifiable, expansion. We, therefore firmly recommend that the ICAR should not, for any reason, add to the number of its Central Institutes system any more at least for the next five years.

(ii) Each of these Institutes has grown simply by accretion over the past many decades, Staff under one Five-Year Plan period has become "committed" during the following Five-Year Plan, and so on from Plan to Plan; and not by virtue of real requirements. Therefore, each Institute should do its cadre-strength review to meet its future needs, and prune its staff strength by freezing vacancies, and by not adding any more posts preferably during the next decade. The existing staff should be redeployed to meet the emergent and exigent new needs.

(iii) The SAUs have been established throughout the country during the last two decades or more to take major responsibility for applied research and adaptive research suited to the regional requirements of the ecospecific system in the respective States. In view of this, the ICAR Institutes should henceforward concentrate more on basic research and strategic research (mission-oriented basic research) which are relevant to the needs of the nation as a whole. The mechanism of applied research on co-operative basis with the SAUs, as suggested elsewhere, should be followed.

(iv) The three National Institutes (IARI, IVRI and NDRI) should be treated as fully autonomous Universities. As long as they stay within their required budgets, they should be able to operate unfettered by administrative and financial brakes. The high-level post-graduate degree programmes underway should continue; in fact, their quality should even further improve. They should count amongst the best research and educational Institutes in the world.

(v) Realizing the lack of strength in rice research and the complexity of problems of its production in the North-Eastern States and Territories, and in Assam, West Bengal and Orissa, and the location of CRRI (Cuttack) in the region, we suggest that the CRRI should be assigned the sole responsibility of conducting, guiding and co-ordinating applied research on rice for this region.

(vi) The Directorate of Rice Research at Hyderabad should be charged with the responsibility for rice research for rest of India not covered by the CRRI, Cuttack. Both the Institutes will share their experience, knowledge and strategies through a common Research Advisory

Committee. This arrangement will help in removing friction between the CRRI, and the Directorate of Rice Research and give due importance, authority and accountability for rice research in respective regions.

(vii) Much emphasis has been made, especially from the side of the SAUs, that the regional research stations of the ICAR Institutes, dotted all over the country, should be closed down, or transferred to the SAUs in whose geographical territory they lie. We understand the Arakeri Committee made specific recommendations about these centres but the ICAR had not implemented them. As the fast-changing environments necessitate reduction of these centres and merging them with the SAUs/NRCs/and other Central Institutes, we suggest that the ICAR may take decision on these recommendations keeping in view the national perspective, economy, efficiency and co-operation in research. We suggest that in exceptional cases where it is still considered advisable to retain a particular centre, it should be referred to an outside experts committee, consisting of three representatives of the ICAR, SAUs and an outside expert. We are convinced that in view of the changed circumstances, such a review is essential and it should be done within a year. The merger of Institutes and programmes which have outlived their utility or no more relevant now, must be looked into.

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APPENDIX 1

INSTITUTES ETC. VISITED BY MEMBERS OF THE ICAR REVIEW COMMITTEE

S.No. (1)	Institutes (2)	Members (3)	Date of visit (4)
1.	National Centre for Mushroom Research and Training, Chambaghat, Solan (HP).	1. Dr J.S.Kanwar 2. Dr K.S.Nandpuri	7-9 May 1987
2.	Dr Yashwant Singh Parmar University of Horticulture and Forestry, Solan (HP).	-do-	
3.	Central Potato Research Institute, Shimla.	-do-	
4.	IARI Regional Station (Wheat Breeding), Tutikandi, Shimla.	-do-	
5.	IARI Regional Station (Horticulture), Shimla.	-do-	
6.	Regional Station of the National Bureau of Plant Genetic Resources, Shimla.	-do-	
7.	Regional Fruit Research Station, Mashobra (HP).	-do-	
8.	Central Potato Research Station, Kufri (HP).	-do-	
9.	IARI Regional station (Cereal Rusts), Shimla.	-do-	
10.	Indian Institute of Horticultural Research, Bangalore.	ICAR Review Committee	16-19 May 1987

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S.No.	Institutes	Members	Date of visit
(1)	(2)	(3)	(4)
11.	University of Agricultural Sciences, Bangalore.	ICAR Review Committee	16- 19 May 1987
12.	Raman Research Institute, Bangalore.	-do-	
13.	Indian Institute of Science, Bangalore.	-do-	
14.	IVRI Campus and NDRI Campus, Bangalore.	-do-	
15.	Institute of Animal Health and Veterinary Biologicals, Bangalore	-do-	
16.	Andhra Pradesh Agricultural University, Veterinary College, Tirupati.	Dr C.M.Singh	19-24 May 1987
17.	Central Food Technological Research Institute, Mysore.	-do-	
18.	Veterinary College, University of Agricultural Sciences, Bangalore.	-do-	
19.	IVRI Campus, Bangalore.	-do-	
20.	Institute of Animal Health and Veterinary Biologicals, Bangalore.	-do-	
21.	NDRI Campus, Bangalore.	-do-	
22.	Central Tuber Crops Research Institute, Trivandrum.	Dr V.A. Pai Panandikar	28 May 1987

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S.No.	Institutes	Members	Date of visit
(1)	(2)	(3)	(4)
23.	Central Agricultural Research Instituire for Andaman and Nicobar Group of Islands, Port Blair (Andamans).	1. Dr J.S Kanwar 2. Dr K.S. Nandpuri	15-24 June 1987
24.	Jute Technological Research Laboratories, Calcutta.	-do-	
25.	Agricultural College, Ghaspani (Nagaland).	-do-	
26.	ICAR Research Station Jharna Pani (Nagaland).	-do-	
27.	Krishi Vigyan Kendra, Jharna Pani (Nagaland).	-do-	
28.	ICAR Research Complex for the North-Eastern Hills Region, Kolasib (Mizoram).	-do-	
29.	ICAR Research Complex for the North-Eastern Hills Region, Shillong (Meghalaya).	-do-	
30.	Rajendra Agricultural University, Pusa, Bihar.	Dr B.Misra	20-22 June 1987
31.	Veterinary College, Patna.	-do-	
32.	Central Research Institute for Dryland Agriculture, Hyderabad.	1. Dr G.Rangaswami 2. Dr J.S.Kanwar	1-2 July 1987
33.	Andhra Pradesh Agricultural University, Hyderabad.	-do-	
34.	National Academy of Agricultural Research Management, Hyderabad.	- do-	

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S.No. (1)	Institutes (2)	Members (3)	Date of visit (4)
35.	Tamil Nadu Agricultural University, Coimbatore.	1. Dr G.Rangaswami 2. Dr B.Misra	4 July 1987
36.	Sugarcane Breeding Institute, Coimbatore.	-do-	
37.	Regional Station of the Central Institute for Cotton Research, Coimbatore.	-do-	
38.	Directorate of Pulses Research, Kanpur.	Dr J.S.Kanwar	17-18 July 1987
39.	Chandra Shekhar Azad University of Agriculture and Technology, Kanpur.	-do-	
40.	Indian Institute of Sugarcane Research, Lucknow.	-do-	
41.	Central Institute of Horticulture for Northern Plains, Lucknow.	-do-	
42.	Bidhan Chandra Krishi Vishwa Vidyalaya, Haringhata (WB).	Dr B. Misra	13 August 1987
43.	Plasticulture Development Centre of the IPCL, Vadodra.	1. Dr C.M.Singh 2. Dr V.A.Pai Panandikar 3. Dr R.C.Paul	25-27 August 1987
44.	National Dairy Development Board, Anand.	-do-	
45.	Veterinary College, Gujarat Agricultural University Campus, Anand.	-do-	
46.	Sher-e-Kashmir University of Agricultural Sciences and Technology, Srinagar (J&K).	Dr B.Misra	9-11 September 1987

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S.No. (1)	Institutes (2)	Members (3)	Date of visit (4)
47.	Central Arid Zone Research Institute, Jodhpur.	Dr R.C.Paul	24-27 September 1987
48.	CAZRI Regional Research Station, Pali (Rajasthan).	-do-	
49.	Madras Veterinary College, TamilNadu Agricultural University, Madras.	Dr C.M.Singh	7-13 October 1987
50.	Livestock Research Station, Kattupakkam, Distt. Chengleput (Tamil Nadu).	-do-	
51.	Prawn Culture Coast Site, Central Institute of Brackishwater Aquaculture, Madras.	-do-	
52.	National Academy of Agricultural Research Management, Hyderabad.	-do-	
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APPENDIX 3

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ADG	Assistant Director-General
AGRIS	International Information System for Agricultural Sciences and Technology
AICRP	All-India Co-ordinated Research Project
AP Cess Funds	Agricultural Produce Cess Funds
ARIC	Agricultural Research Information Centre
ARS	Agricultural Research Service
ASRB	Agricultural Scientists Recruitment Board
BARC	Bhabha Atomic Research Centre
CARIS	Current Agricultural Research Information System
CAZRI	Central Arid Zone Research Institute
CDRI	Central Drug Research Institute
CFTRI	Central Food Technological Research Institute
CG	Consultative Group
CIFA	Central Institute of Freshwater Aquaculture
CIFE	Central Institute of Fisheries Education
CIMAP	Central Institute for Medicinal and Aromatic Plants
CIMMYT	Centro Internacional de Mejorimento de Maize y Trigo (International Improvement Centre for Maize and Wheat)
CIP	Centro Internacional de la Papa (International Potato Research Institute)
CMFRI	Central Marine Fisheries Research Institute
CPCRI	Central Plantation Crops Research Institute
CRIDA	Central Research Institute for Dryland Agriculture
CRRI	Central Rice Research Institute
CSC	Centre-State Co-ordination
CSIR	Council of Scientific and Industrial Research
CSSRI	Central Soil Salinity Research Institute
CSWCRTI	Central Soil and Water Conservation Research and Training Institute
DA	Dearness Allowance
DAE	Department of Atomic Energy
DARE	Department of Agricultural Research and Education
DBT	Department of Biotechnology
DDG	Deputy Director-General
DGS & D	Directorate-General of Supplies and Disposal
DNES	Department of Non-conventional Energy Sources

DOD	Department of Ocean Development
DPAP	Drought-Prone Areas Programme
DST	Department of Science and Technology
EFC	Expenditure Finance Committee
FA	Financial Adviser
FAO	Food and Agriculture Organization
FMD	Foot-and-Mouth Disease
FTC	Farmers' Training Centre
GB	Governing Body
GBPUAT	Govind Ballabh Pant University of Agriculture and Technology
GNP	Gross National Product
HAU	Haryana Agricultural University
IARC	International Agricultural Research Centres
IARI	Indian Agricultural Research Institute
IASRI	Indian Agricultural Statistics Research Institute
IBPGR	International Board for Plant Genetic Resources
ICAR	Indian Council of Agricultural Research
ICARDA	International Centre for Agricultural Research in the Dry Areas
ICARNET	Computerized Satellite-based ICAR Information Network
ICMR	Indian Council of Medical Research
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
ICSSR	Indian Council of Social Sciences Research
IDA	International Development Association
IDC	Indian Dairy Corporation
IFA	Internal Financial Adviser
IFPRI	International Food Policy Research Institute
IIHR	Indian Institute of Horticultural Research
IIM	Indian Institute of Management
IISR	Indian Institute of Sugarcane Research
IIT	Indian Institute of Technology
IITA	International Institute of Tropical Agriculture
IMD	Indian Meteorological Department
IRRI	International Rice Research Institute
ISNAR	International Service for National Agricultural Research
ISRO	Indian Space Research Organization
IVRI	Indian Veterinary Research Institute
JCM	Joint Consultative Machinery
KGK	Krishi Gyan Kendra
KVK	Krishi Vigyan Kendra
LDC	Lower Division Clerk
LLP	Lab-to-Land Programme
MPAU	Mahatma Phule Agricultural University

NAARM	National Academy of Agricultural Research Management
NARP	National Agricultural Research Project
NARS	National Agricultural Research System
NBRI	National Botanical Research Institute
NBSSLUP	National Bureau of Soil Survey and Land-Use Planning
NDDB	National Dairy Development Board
NDP	National Demonstrations Project
NDRI	National Dairy Research Institute
NRC	National Research Centre
NRSA	National Remote Sensing Agency
ORP	Operational Research Project
PAU	Punjab Agricultural University
PERT	Programme Evaluation Review Technique
PIC	Project Implementation Committee
QRT	Quinquennial Review Team
R & D	Research and Development
SACC	Scientific Advisory Committee to the Cabinet
SAU	State Agricultural University
SBI	Sugarcane Breeding Institute
SFC	Standing Finance Committee
SRC	Staff Research Council
S & T	Science and Technology
TA	Travel Allowance
TOT	Transfer of Technology
TTC	Trainers' Training Centre
T & V	Training and Visit
UGC	University Grants Commission
UNDP	United Nations Development Programme
UPSC	Union Public Service Commission